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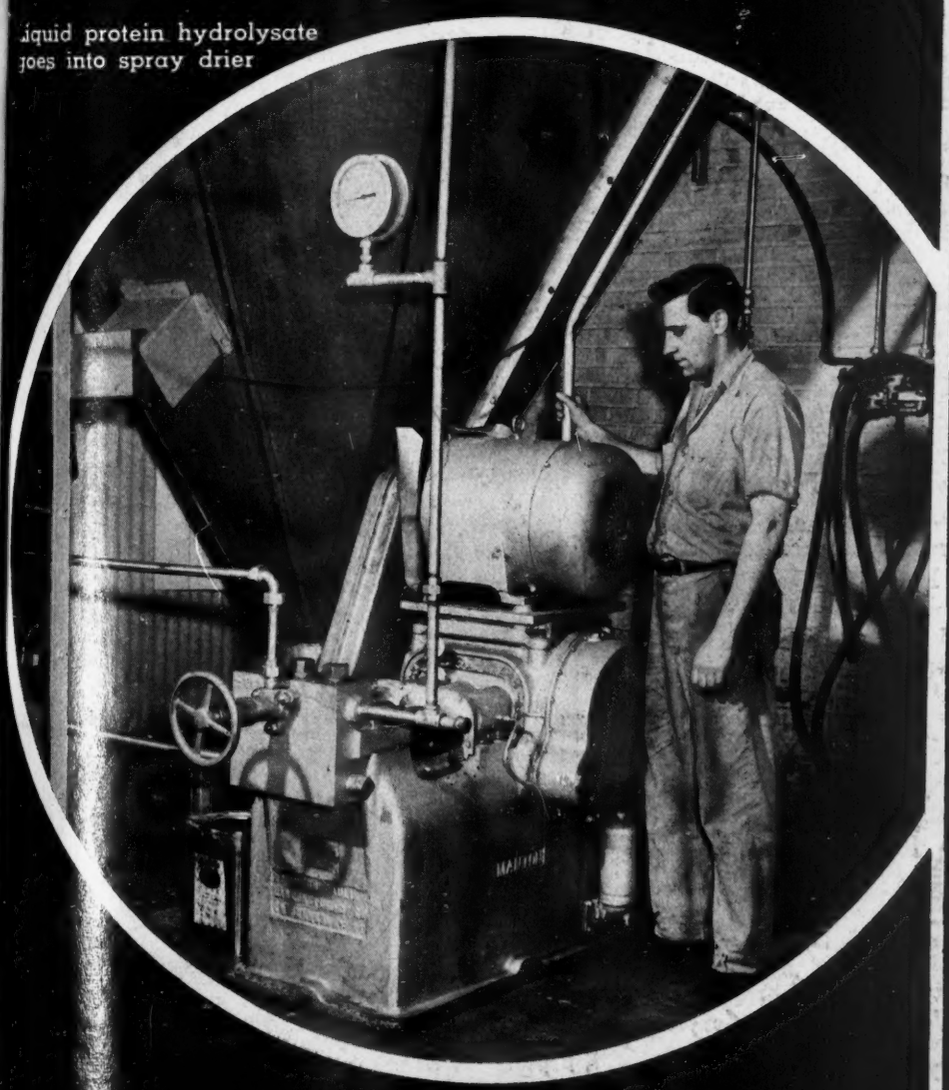
FOOD INDUSTRIES

NATIONAL EDITION

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Liquid protein hydrolysate goes into spray drier

AUGUST 1948

Advanced Food Plant Engineering

Protein Hydrolysate As Flavoring Agent

Bakeries Benefit From Cost Control

Curbing Mackerel Fillet Rancidity

Novel Methods for Making Corn Chips

How Cheese-Bacon Franks Are Made

Modern Practice In Bottling Plants

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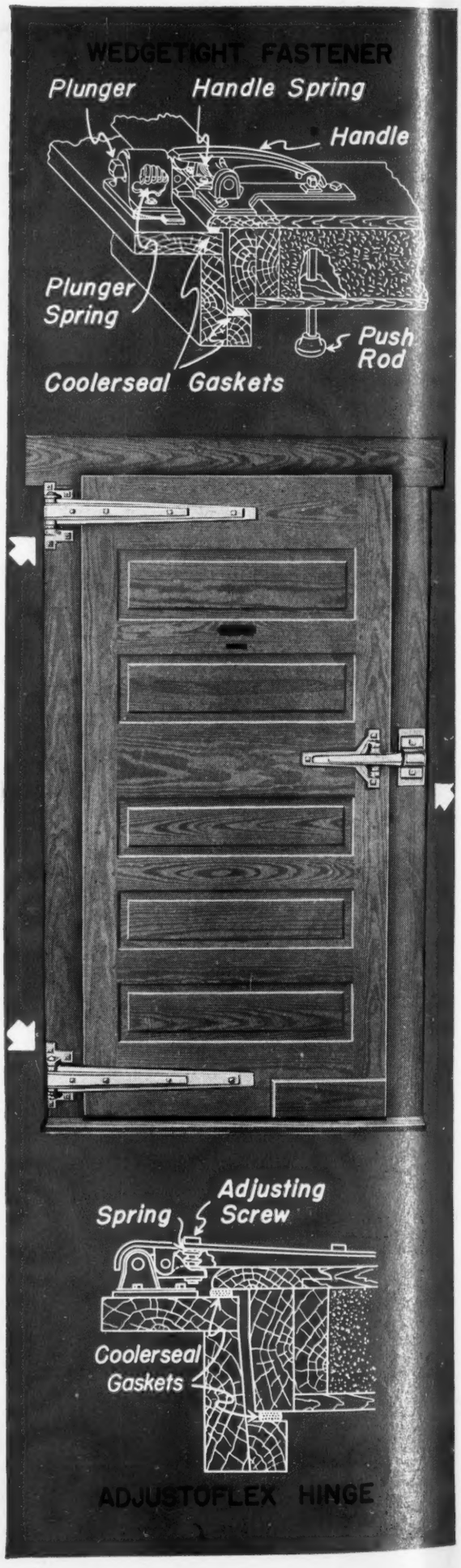

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THE COVER—Spray drying is an important step in the production of protein hydrolysate at Griffith Laboratories, Inc., Newark, N. J. The drier, engineered by Griffith, has a capacity of 200 lb. of dry product per hour. Lower part of chamber is shown here, behind Manton-Gaulin hydraulic, 3-piston pump. Pump operates at 1,000 psi. For more pictures and story on protein hydrolysate, see page 108.

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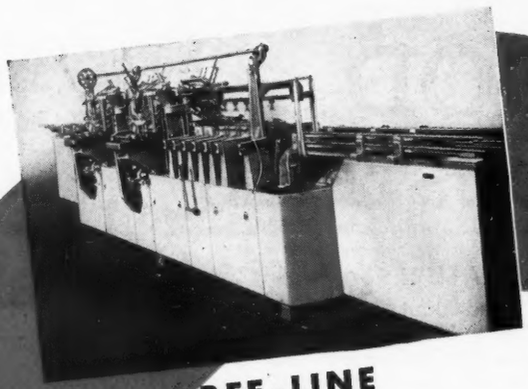

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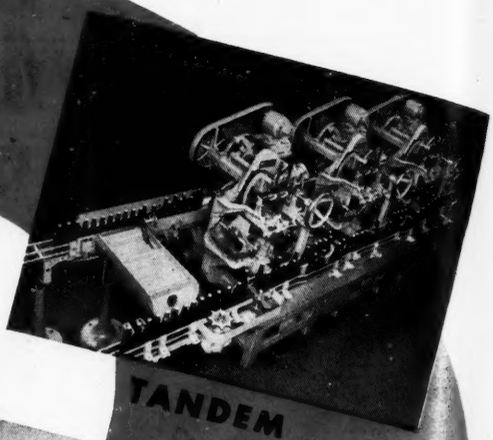

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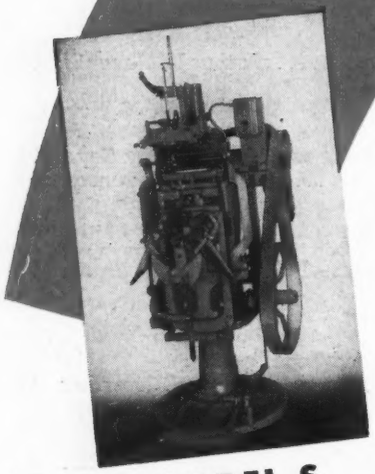

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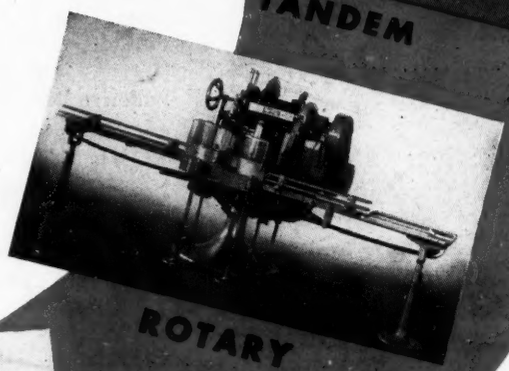

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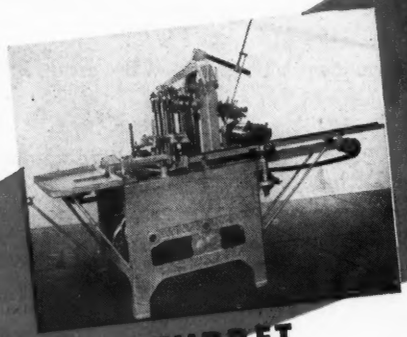

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FOOD INDUSTRIES

AUGUST, 1948

Advanced Food Plant Engineering

TOMORROW'S profits in your company can be read from today's blueprint of processes and operations. If that blueprint pictures antiquated equipment and methods, your stockholders are due for a disappointment. If it shows advanced food plant engineering, the stockholders of your more backward competitors will hold the bag.

Never before has production efficiency paid such big dividends, or inefficiency paid such small ones. High cost of labor is the reason. In a typical food plant the men workers are paid 90 cents to $1.35 an hour, women, 80 cents to $1.00. The time has passed when a lot of low-priced labor could be used in lieu of an efficient plant.

In three years, one of the large bakeries spent $11 million for new plant and equipment, and has earmarked an additional $34 million. The goal is to cut the direct labor cost of baking 50 percent and increase profits by one-half. Advanced methods ranging from automatic handling of bulk materials to continuous mixing and faster packaging are being utilized. Continuous band ovens are replacing the old reel ovens and saving $1.20 per 100 lb. in the production cost of a typical product.

This bakery may have a more ambitious cost-reduction-through-modernization program than most, but other progressive food processors are moving in the same direction. They are attacking costs particularly through continuous processing and more efficient materials handling. They are out for more efficient packaging operations, too. But advanced food plant engineering is utilized to improve many other aspects of the operations.

A large fruit canning company expects to have all of its processing on a continuous basis within a year. "The importance of the elimination of batch operations in favor of continuous is immediately apparent. It is one of the important means by which we combat constantly rising costs of material and labor." Better and more uniform quality, together with improved sanitation, are plus values of this company's continuous processes.

In a progressive milling company, a sizable engineering and research staff is continually applying the latest knowledge of food plant engineering to new installations and to the revamping of old ones.

Another nationally important food processor tells us that food plant engineering is only in its infancy and that increased costs of labor and materials are lending greater importance to progressive engineering.

In the dairy industry there is a definite trend toward continuous processing, notable examples being short-time high-temperature pasteurization and continuous freezing of ice cream. A continuous process for making butter has been developed, and a continuous sterilizing process has gained favor in making evaporated milk.

Everywhere in the food processing industry you find this line of thinking: "The present trends in labor and material costs are placing a new emphasis on the importance of engineering in food plants." The food processor is feeling the squeeze of competitive pressure on one hand and cost pressure on the other — a situation which demands constant revaluation of plant technics.

Cost cutting, of course, is but one of many advantages realized from advanced food plant engineering. Better quality and improved sanitation are others already noted. Then to these you can add increased capacity, better working conditions, and improved public relations.

Because of the current importance of modernization, FOOD INDUSTRIES will publish a series of articles about food plants utilizing advanced engineering. We start with a report on a model small-city dairy plant in this issue. Many more articles on advanced plants in a variety of food processing industries will follow in subsequent issues.

H K Fawler

EXECUTIVE EDITOR

The Talk of the Industry

• Food processors will have to pay higher prices for an important raw material—sugar. The Department of Agriculture has seen to this by cutting the quota that may enter the U. S. by 500,000 tons. The reason is that "the present price of sugar is more than 1 cent a pound below the average price which would reflect the relationship between the price of sugar and the cost of living required by the act (Sugar Act) to be taken into consideration."

According to B. W. Dyer and Co., sugar economists and brokers, raws and futures have a theoretical potential rise of $1.50 per 100 lb. above the $7.50 June price in the East and West. Any more space now available in your warehouse?

• Dawn of the Atomic Age quite naturally posed the question as to whether radioactive iostopes could be used to sterilize foods and avoid the effects of heat processing on flavor, texture and vitamin content. So researchers at Continental Can Co. studied the effect of radioactive phosphorus on a suspension of *Escherichia coli*. The idea was that if complete sterility of a suspension could not be obtained under most favorable conditions, then the application of radioactive materials to the much more complicated conditions of a food product could not at present be considered practical. Complete sterilization was not attained, and the technologists concluded that their experiment did not suggest the possibility of using radioactive materials to sterilize foods.

If sterilization had been achieved at the highest concentration tested, the cost per No. 2 can would have been $3,660. So don't throw out your retorts or pasteurizers.

• Ever hear of "sweetfat?" Sweden has been doing a nice export business in this product. It reportedly contains 40 percent sugar, 25 percent fat, 10 percent milk powder, 10 percent glycerine, and 15 percent liquid (probably water). It keeps well under refrigeration, and English bakers have bought it by the ton. These bakers don't think too much of it, and the price of 50c a pound is a little steep for fat and sugar, but it has helped them to increase production.

• Edible "wrappers" for candy bars are the goal of experimental work by Army food technologists. Appreciative of an international situation which might call for fighting in Arctic regions, the Army wants candy that soldiers can eat without taking their gloves off to remove the wrapper. One way of achieving this seems to be to dip the candy in a 3 percent solution of low-methoxyl pectin and then in a solution of sodium chloride. This forms a protective film of edible sodium pectinate all over the confection.

If certified food colors were added, the soldier could distinguish different flavors with one eye while keeping the other on enemy territory.

• There being only so many good hotel rooms in Atlantic City, the canners and brokers have decided to go their separate ways at convention time next year. The canners will meet in Atlantic City in January, the brokers in Chicago in March. We'll bet there will be plenty of brokers at the canners' confab, and vice versa. Neither group is likely to ignore a meeting at which the other congregates in great numbers.

• Progress in food processing has given the lie to another old concept—the general belief that farmers eat better than city folks. General Mills brought this to light in survey among school children in Minnesota cities and rural areas. The study revealed that 42 percent of the city children had good diets, but only 27 percent of the country kids.

Even more to think about is the revelation that poor diets were eaten by 28 percent of children in the cities and 40 percent of those in the country. General Mills' findings indicate that the diets of nearly 14,000,000 of the nation's 24,000,000 school children need improvement.

Yes, there is a better-feeding job to be done in the good old U. S. A., as well as abroad. Improvement in the diet here, along with the population growth, will mean more business for food processor, irrespective of the availability of dollars for food purchases abroad.

• There is a market for an improved piece of equipment in the confectionery industry. The sweets makers are trying to develop a sanitary substitute for the wooden starch tray. They are experimenting with a plastic tray, but have not adopted it. Any suggestions?

Hors d'Oeuvres

• Per capita candy sale for the U. S., in 1947, was $12. National Confectioners Association says its goal is $14.28. Looks like a compromise figure for those nickel bars that are selling for six and seven cents.

• *From the North Carolina State news bureau we learn that a ramp, "called a rampion by Webster," is actually a leek. There are two descriptions: 1. "It's a sort of an onion, except better." 2. "It's a sort of an onion, except worse." Anyway, it's a ramp.*

• In like periods last year and this, Wisconsin collected $20,000 and $448,000, respectively, from its 15 cents a pound oleo tax. Can it be that the dairyland might not secede after all.

• *After describing a nut meat process in meticulous detail—"18 percent protein," "20 percent sodium sulphate," "83 deg. C." "aging solution for 2 hours," etc. etc., a USDA writer apparently just couldn't face another close measure. "They are rolled into flakes," he says, "that are not too thin and not too thick."*

• National Fisheries "Flashes", for May 22, announced an "Oyster Convention." They didn't enlarge upon it in the story, either. Just called it a well planned event. We still don't know what in the world to think.

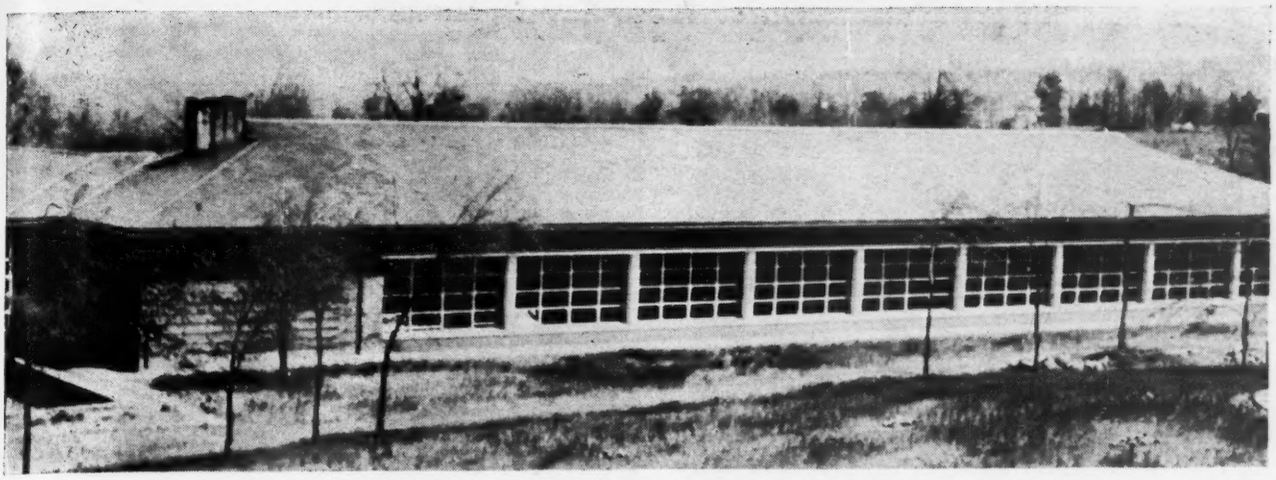
• *"If you're overweight, you overeat." That's what Dr. Louis H. Newburgh, University of Michigan Medical School, says. No use blaming it on anything else. It's high time your competitors gave some thought to mending their advertising ways.*

• In Philadelphia—of all places—a chain grocery put on a fashion show, complete with runway, music, etc., to bring customers into their stores. Some shoppers were so impressed they didn't discover until they got home that the bite at the end of the checkout line had gone as deep as ever.

• *It wasn't as hard as you might think for us to figure out why the National Pickle Packers Association chose Dill L. Pickle, of Rolling Fork, Miss., as their "man of the year." The thing that has us stumped is—Now what?*

• If it's only curiosity that prompts customers to use milk bottles as banks, Borden's supplies some answers. A quart bottle will hold $13.11 in pennies, $44.30 in nickels, $187.70 in dimes and $206.75 in quarters. Heck, if they work that well, let's have bigger necks for halves and silver dollars.

J.A.J.J.



Modern design, scientific lighting, ample space are features of Morristown facility.

Advanced Engineering Is Emphasized in New Dairy

One-story plant has efficient floor plan, concealed utility lines and latest type stainless steel equipment. Filtered air supply and exhaust fans make operating areas condensate-free. Has sewage disposal system

By ARTHUR V. GEMMILL
Assistant Editor
"Food Industries"

A BLUEPRINT for the small city dairy plant of the future was drawn when the Farmers & Consumers Dairy designed their recently completed plant in Morristown, N. J. In line with the present-day trend, the plant was located outside the city limits. It is on a 17-acre plot which assures ample room for future expansion. Yet it is adjacent to an arterial highway that provides the traffic necessary to support the dairy bar—a necessary feature of today's dairy plant.

Carefully Planned

The one-story plant, multi-story office principle has been used in conjunction with modern design, materials, and the latest and most efficient equipment. The result is a plant that is economical to operate and to maintain. Process piping has been held to a minimum by careful placement of equipment and a well thought-out floor plan. Equipment and piping are easily accessible for daily dismantling, cleaning and sterilizing. Only two pumpings of the milk are required, thus reducing agitation to a minimum.

The architecturally attractive building is constructed of face brick with a slate roof. Insulite windows are used throughout. The office section consists of 2 stories and basement. In the basement are located a deep well pump and 7,500 gal. water storage tank, transformer room, storage room for supplies that must be kept under lock, and men's locker rooms. Offices take up practically the entire first and second floors. The dairy bar is temporarily located on the first floor adjacent to the business office (see Fig. 1). Attached to the office is a one-story garage 141 x 30 ft., with provision for truck maintenance, washing and storage.

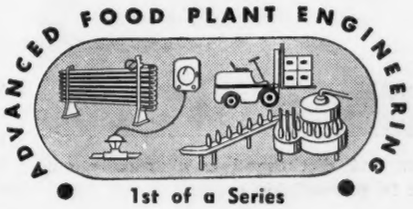
Studied arrangement of the plant on its site permits truck loading, unloading and parking completely concealed from public view. Parking space is provided in front of the plant for the convenience of visitors and for patrons of the dairy bar.

In the one-story pasteurizing plant, windows are glazed with heat resistant green Alka glass. Inside walls are of cream colored ceramic tile, and floors are of red acid-proof brick. Ceilings are of "transite", an asbestos board that is resistant to steam, moisture and mold, and does not require painting.

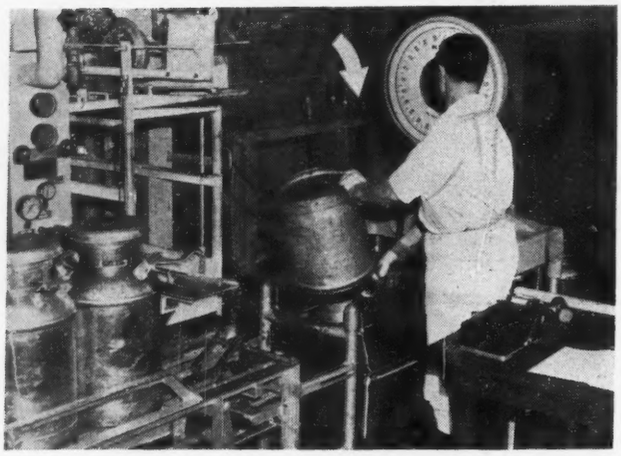
Air Changed Frequently

To overcome the condensation problem resulting from the large amounts of steam liberated in processing, the plant is completely air-conditioned. The air in each processing room is changed every three minutes. Air is removed by exhaust fans, and filtered fresh air is supplied by the conditioning system which is located above the case storage room. Fin-type steam coils are installed in the air supply ducts to provide warm air for heating during the winter season.

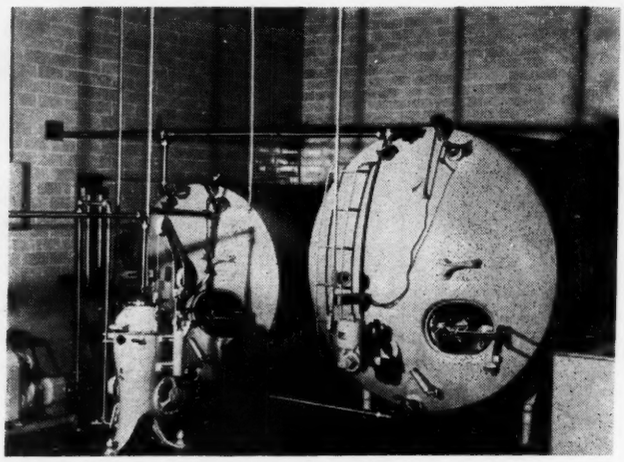
Product cooling is done with well water and 32 deg. F. sweet water. Temperature of the sweet water is maintained by a latent heat plant located in the engine room. A 5 x 5 ammonia



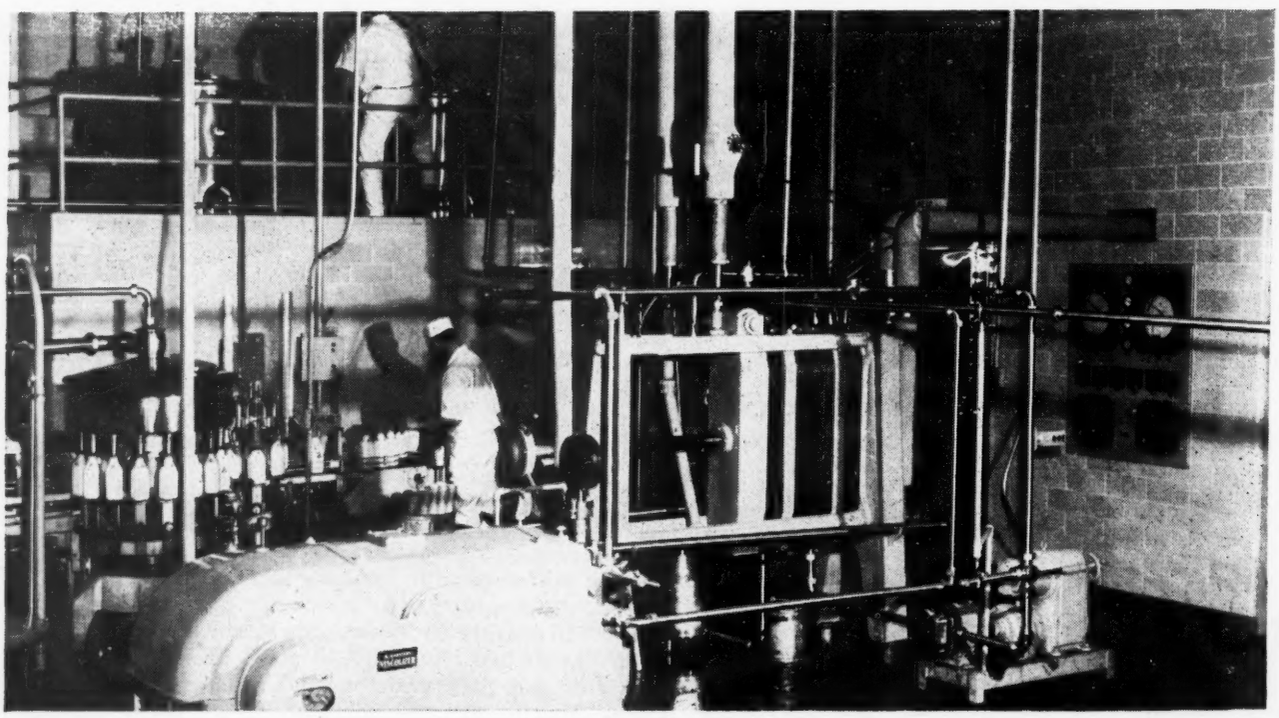
Smooth Integration of These Key Operations . . .



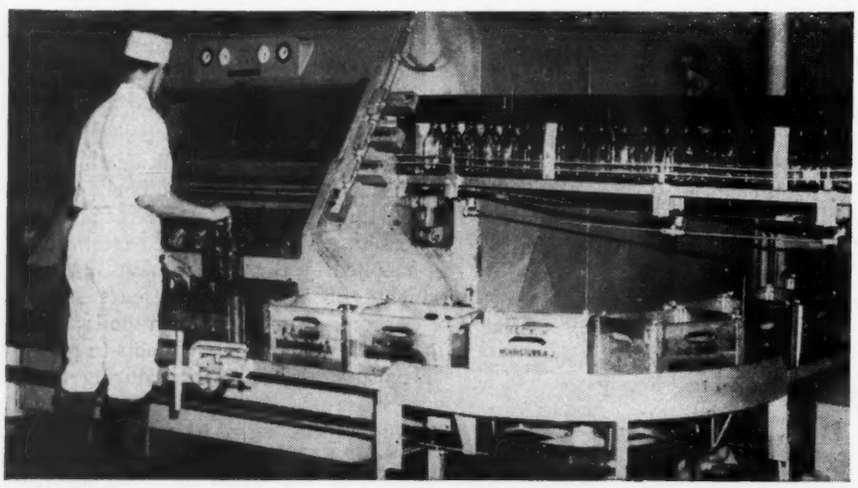
RECEIVING ROOM. Incoming milk is weighed, and then cooled to 34 deg. F. by plate unit (arrow) as it is pumped to . . .



RAW MILK STORAGE TANKS. From here the milk is pumped through clarifier (left foreground) before pasteurization.



PASTEURIZATION by short-time high-temperature methods and cooling to 34 deg. F. are accomplished in plate unit (right). Cooled milk then flows to balance tanks (rear) which feed filler by gravity. Viscolizer is used for homogenized milk and ice cream mix.



BOTTLES are washed in 10-wide soaker-washer and discharged automatically onto chain type conveyor that supplies bottles to filler in pasteurizing room.

compressor, automatically controlled, maintains an ice bank on the refrigerating coils in the sweet water tank. The milk storage room is held at approximately 36 deg. F. by means of a floor-type blower unit and 5 x 5 compressor. An additional 5 x 5 compressor provides refrigeration for the ice cream department. Steam is supplied by two 60-hp. oil fired boilers.

Utility Pipe Lines

An unusual feature of the plant design in the elimination of utility pipe lines from walls and ceilings of processing rooms. All steam, well water, sweet water and ammonia headers are suspended from the steel roof rafters, and run above the ceilings of the rooms. Where needed to supply units

. . . Was Assured by Careful, Detailed Planning

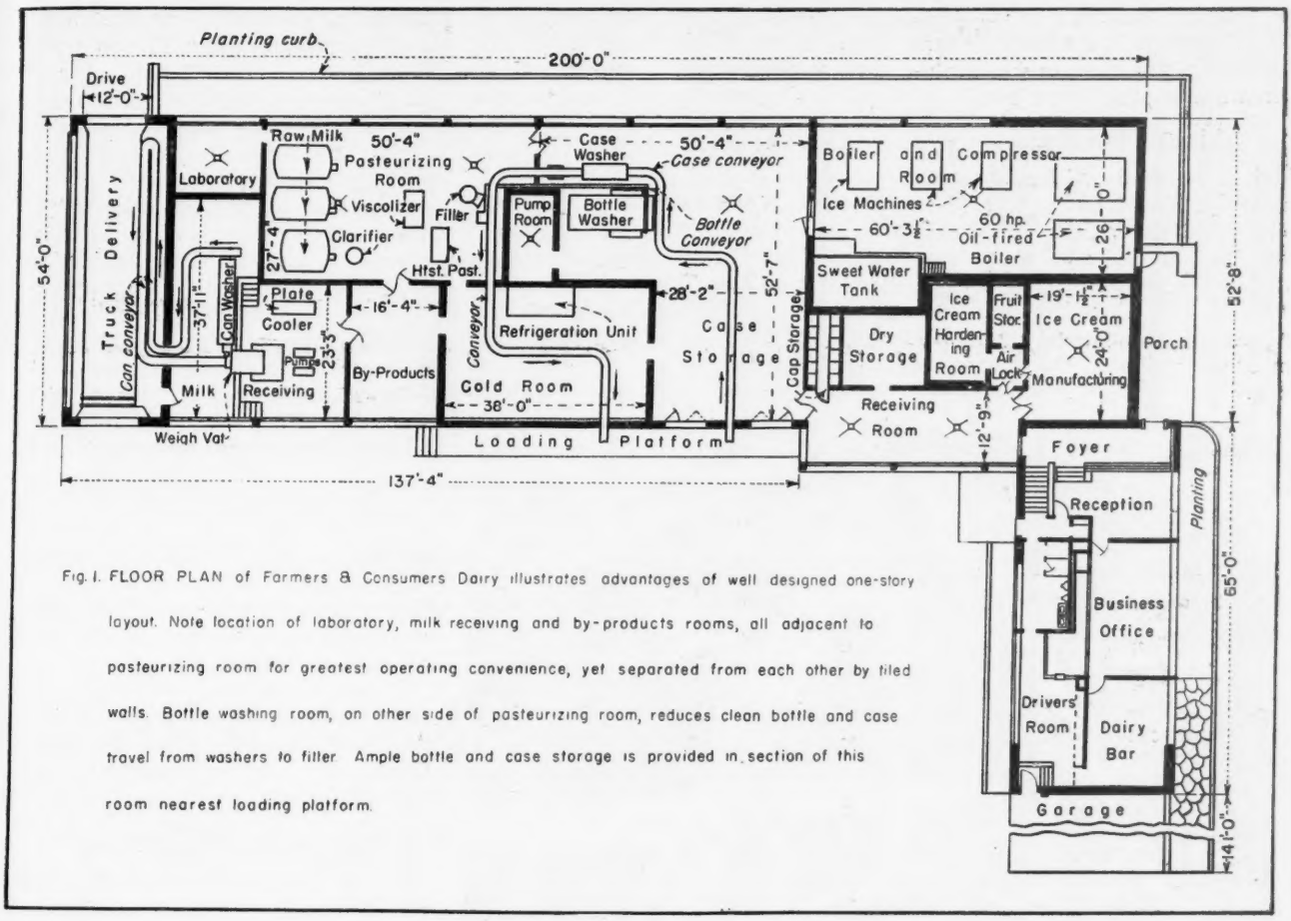


Fig. 1. FLOOR PLAN of Farmers & Consumers Dairy illustrates advantages of well designed one-story layout. Note location of laboratory, milk receiving and by-products rooms, all adjacent to pasteurizing room for greatest operating convenience, yet separated from each other by tiled walls. Bottle washing room, on other side of pasteurizing room, reduces clean bottle and case travel from washers to filler. Ample bottle and case storage is provided in section of this room nearest loading platform.

Large Lot Permits Inclusion of Disposal Plant

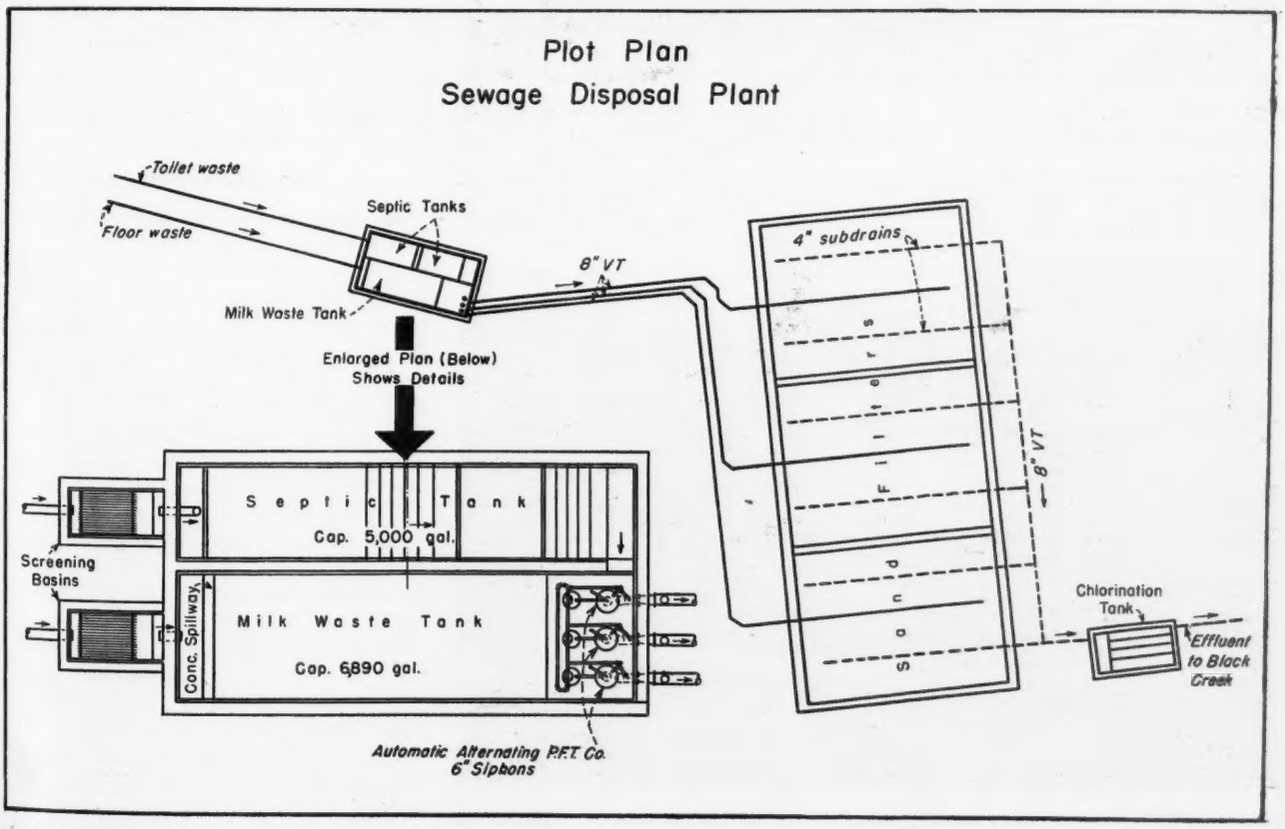


FIG. 2. WASTES flow from plant to digestion tanks and through the entire system without the aid of pumps.

of equipment, branch lines are run down through the ceiling directly above the equipment. T's are installed at 12 ft. intervals in the main headers to facilitate piping changes without interference with plant operations.

Plant Operations

Milk is collected in 10-gal. cans by Farmers & Consumers trucks, from producers in the vicinity of Morristown. Cans are unloaded onto a conveyor in the enclosed truck delivery depot (see Fig. 1.) and conveyed into the receiving room where the milk is dumped and weighed. Empty cans and lids are put through a straight line can washer that discharges onto a conveyor which returns the clean cans to the truck. Sufficient storage space is provided on the filled and empty can conveyors to permit complete unloading of a truck without removal of the empties.

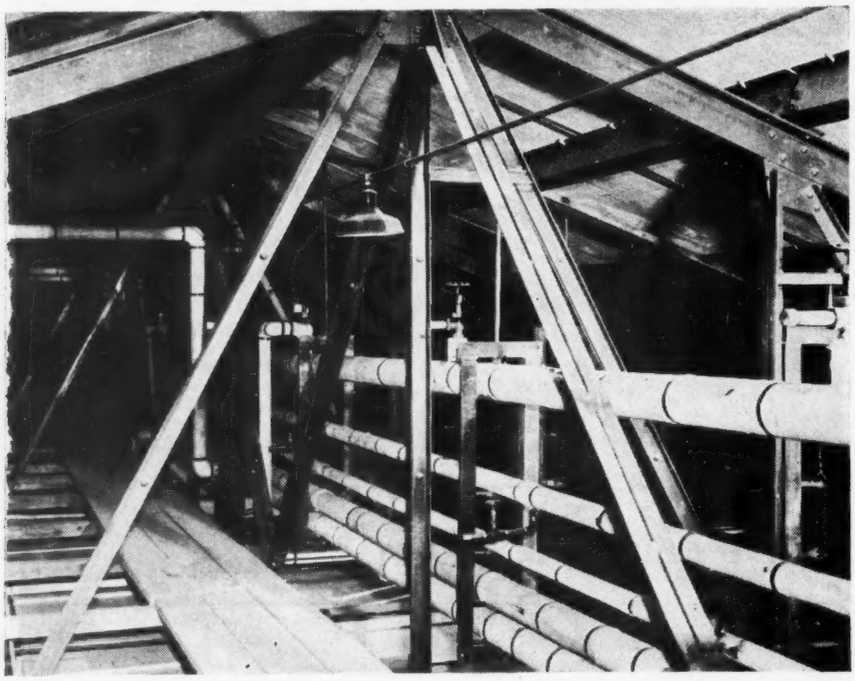
From the weigh tank the raw milk is pumped through a plate-type cooler, that cools it to approximately 34 deg. F. then into one of the insulated storage tanks located in the adjoining pasteurizing room. For processing, the raw milk is pumped from a storage tank through the clarifier and plate type HTST pasteurizer. The pasteurized milk is cooled to 34 deg. F. before leaving the HTST unit. Upon leaving the plate unit it flows into one of the balance tanks, located on the mezzanine directly behind the filler. Flow of milk from balance tanks to filler is by gravity. Homogenized milk is produced by viscolizing the hot milk between the heating and cooling cycles of the HTST pasteurizing operation.

Bottles are washed immediately before filling by means of a 10-wide soaker-type washer. The clean bottles are discharged from the washer onto a chain conveyor that feeds them directly to the filler in the adjoining pasteurizing room. Empty cases are conveyed to a case washer and then to the filler.

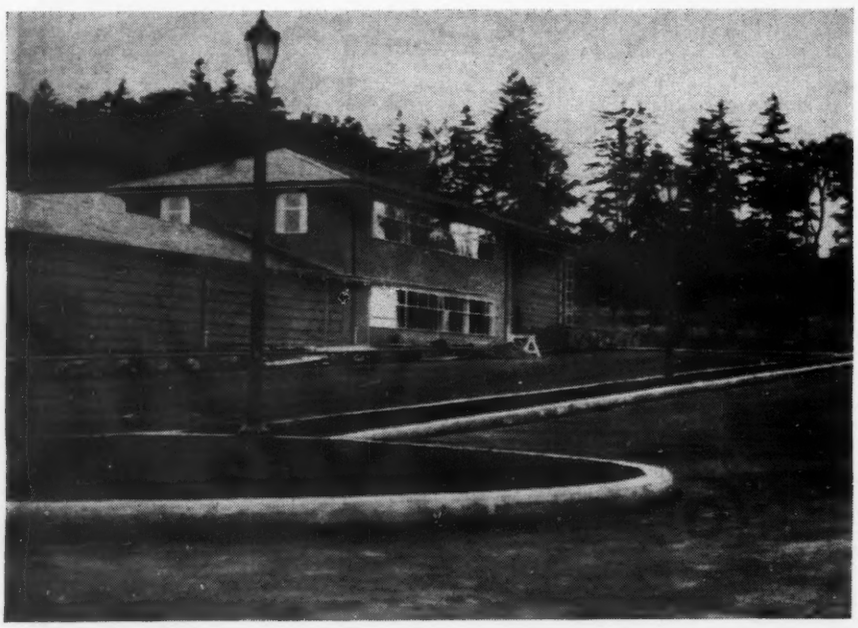
Filled bottles are inspected and placed in the cases which are conveyed into the milk storage room. Portable roller conveyors are used for truck loading.

By-products are handled in the special by-products room which is adjacent to the receiving, pasteurizing and cold storage rooms.

Present capacity of the plant is approximately 30,000 qts. per 8 hr. day. As a result of careful design, however, this capacity may be greatly increased without difficulty.



STEAM, water and ammonia headers are suspended from rafters above ceiling of operating areas. To facilitate piping changes T's and valves are installed each 12 ft.



PARKING SPACE, for customers of dairy bar and visitors, is provided in front of the building. Dairy bar is temporarily located in 2-story office section.

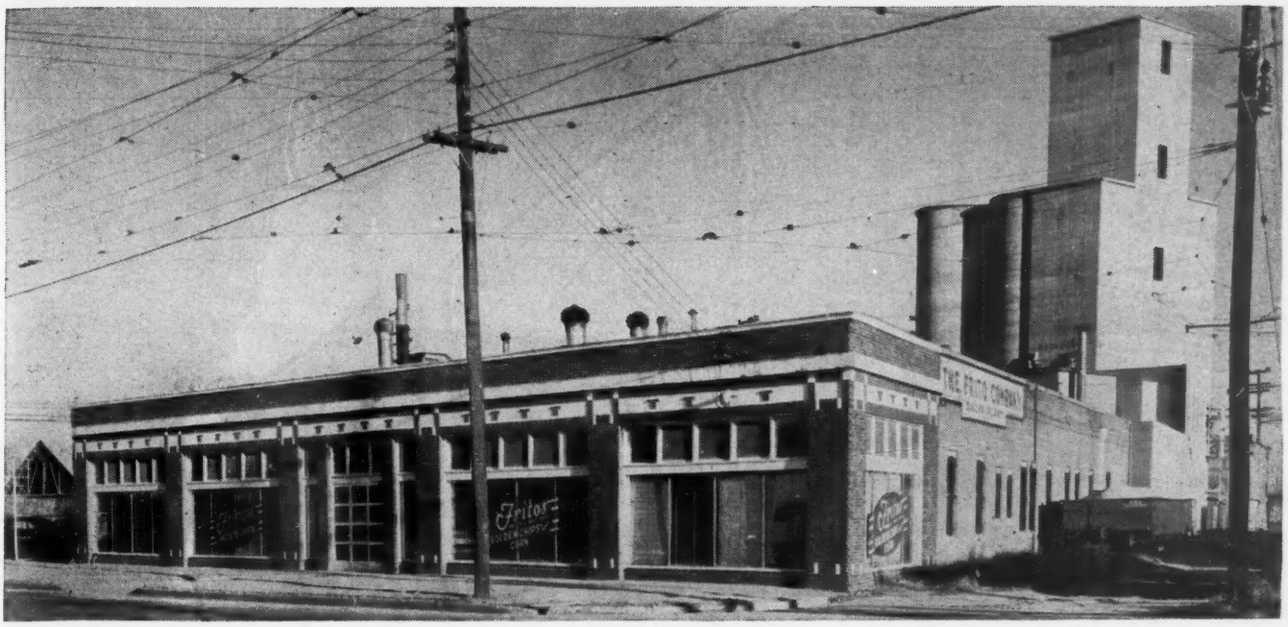
Ice Cream Manufacture

A fully equipped ice cream plant was provided to furnish ice cream for the dairy bar. Mix is made in the milk processing room and transported in portable 50-gal. tanks to the ice cream freezing room. Here it is frozen in a 75 gal. per hr. Vogt freezer. It is hardened and stored in the adjacent hardening room. Ice cream is transferred to the dispensing cabinets in the dairy bar as required.

Sewage Disposal

Another outstanding feature of the plant is the system for treatment of plant wastes (see Fig. 2). This consists of a 2 compartment septic tank for toilet waste; an additional tank for floor waste; 3 sand filters and a chlorination tank. In the discharge end of the floor waste tank are 3 automatic alternating 6 in. siphons. Each of the siphons discharges to only one of the sand filters. By this arrangement the filter beds are flooded consecutively.

Effluent from the septic tank overflows into the floor waste tank where it is thoroughly mixed with milk waste before being discharged to the sand filters. From the sand filters the effluent flows to the chlorination tank where it is chlorinated and discharged into a small stream. As a result of the natural slope of the plot the entire sewage disposal system which is located a desirable distance from the plant, operates by gravity.



MANUFACTURING PLANT of the parent Frito Company at Dallas, Tex., showing new $115,000 elevator used for storage of corn.

Processing Technics, Machines Boost Corn Chip Business

The formula and manufacturing rights for Fritos cost $100 fifteen years ago. Last year the Frito companies grossed into the millions

By ROY BOYD, Plant Manager, The Frito Company, Dallas, Texas

COMPARATIVELY unknown a few years ago, Fritos, corn chips, are now manufactured and distributed throughout the U. S. and in Hawaii and Australia. The parent company operates in certain territories while licensees and distributors manufacture for and supply the other areas. The company was organized in 1932 and, since there were no machines available for the manufacture of corn chips, it was necessary to invent or adapt other machines and equipment to the process. Some of these machines, especially the extruder and cooker, are not completely patented, so all details concerning them cannot be disclosed. While the process is not a complex one, the real problems are concerned with securing the best quality and variety of corn and the technics of good processing.

Fritos are corn chips, made from ground whole grain corn, cooked in vegetable oil with salt added. The corn used is chosen from several varieties. A blend of white and yellow varieties is best and this blend is varied, due to local taste preferences, in the different areas in which Fritos are sold. The variety and quality of corn used is one of the determining factors controlling the quality of the finished product. The company employs a corn buyer, who travels throughout the corn producing regions. Constant research and laboratory experiments have demonstrated that the locality in which the corn is grown, the variety, its moisture content and age are of critical importance to the quality of the finished product.

Besides having an adequate supply of corn on hand for processing, the problem of deterioration in improper storage caused the company to build its own corn storage elevator. The elevator has a capacity of 88,000 bushels and is equipped with the most modern cleaning and fumigating equipment.

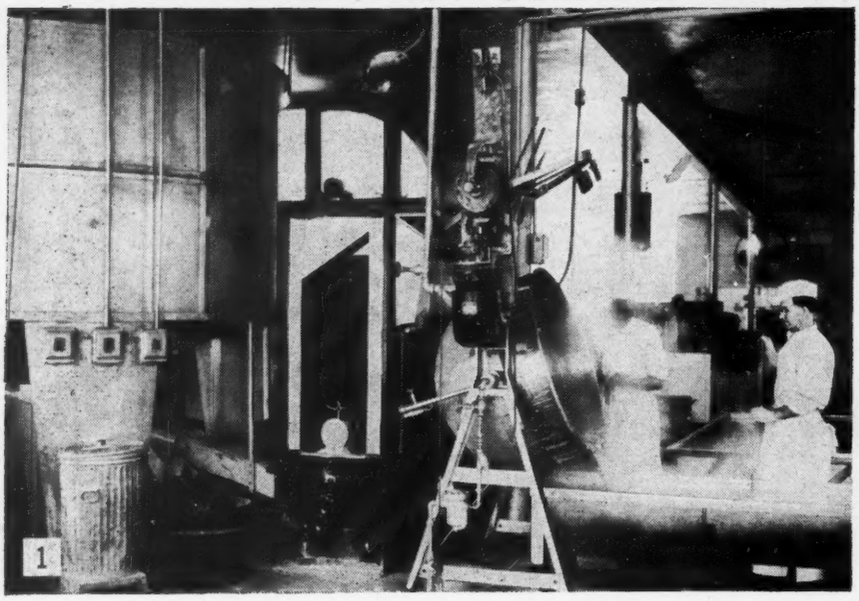
Upon arrival at the elevator the corn is cleaned and all extraneous matter separated from it. It is then transferred to storage bins and, until moved into the process, is inspected frequently for moisture content and possible insect infestation. For the outlying factories, the corn is sacked for shipment. But for the adjoining plant it is conveyed to a storage bin by spouts and conveyors.

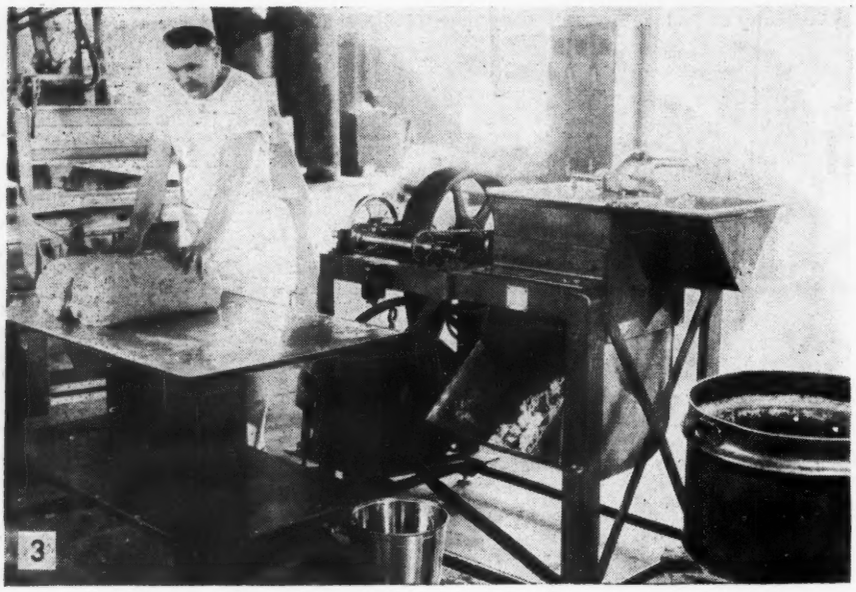
How They Are Made

The first step in processing is pre-cooking. Corn is automatically elevated into a stainless steel, steam-jacketed kettle, which is equipped with an agitator to insure uniform cooking. A mild alkaline solution is then added. The length of time, and the temperature at which the corn is cooked in this solution, are determined by the variety and condition of the grain.

When a batch has been pre-cooked it is emptied into a stainless steel vat and subjected to a soaking period—an important factor in the process. The solution must penetrate each grain

Corn is Steeped in Alkali, Ground Into Masa, Formed Into Loaves

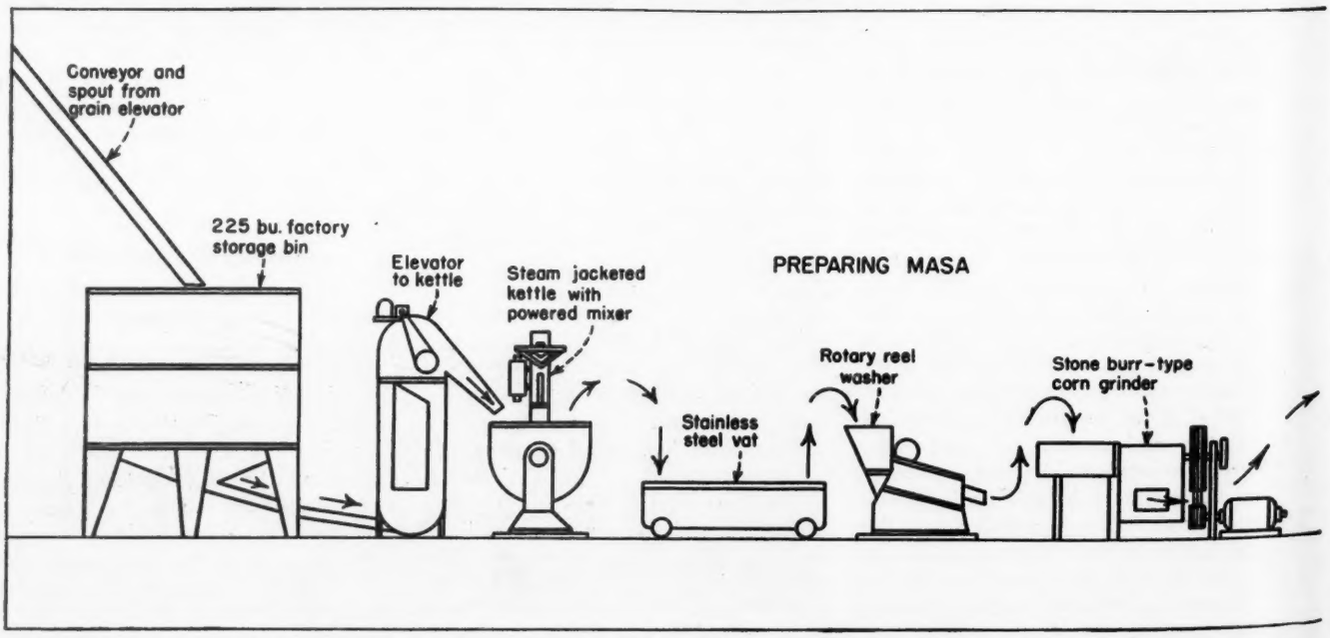




1. **WHOLE GRAIN CORN,** in measured amounts, is pre-cooked in mild alkaline solution in this steam-jacketed kettle, then dumped into portable stainless steel vats to soak.

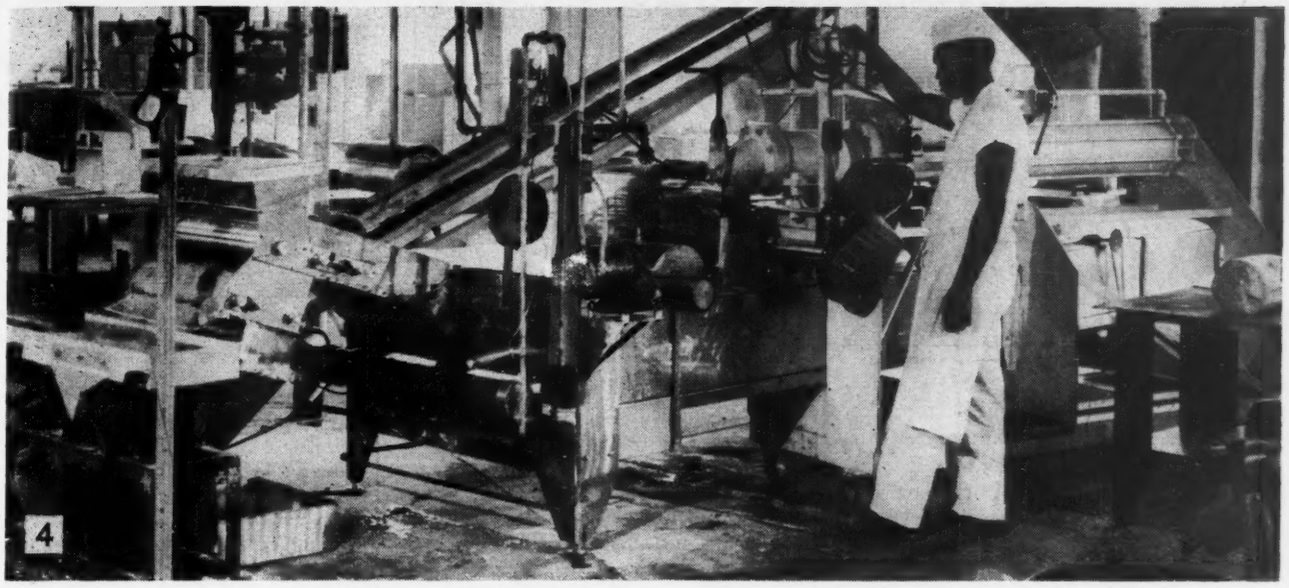
2. **AFTER STEEPING** in the portable vats to insure complete penetration of the alkaline solution, the corn is washed with cold water in this rotary reel-type washer.

3. **WASHED CORN** is ground in a stone, burr-type grinder. The ground corn, called masa, is then formed into cylindrical shaped loaves weighing approximately 20 pounds.

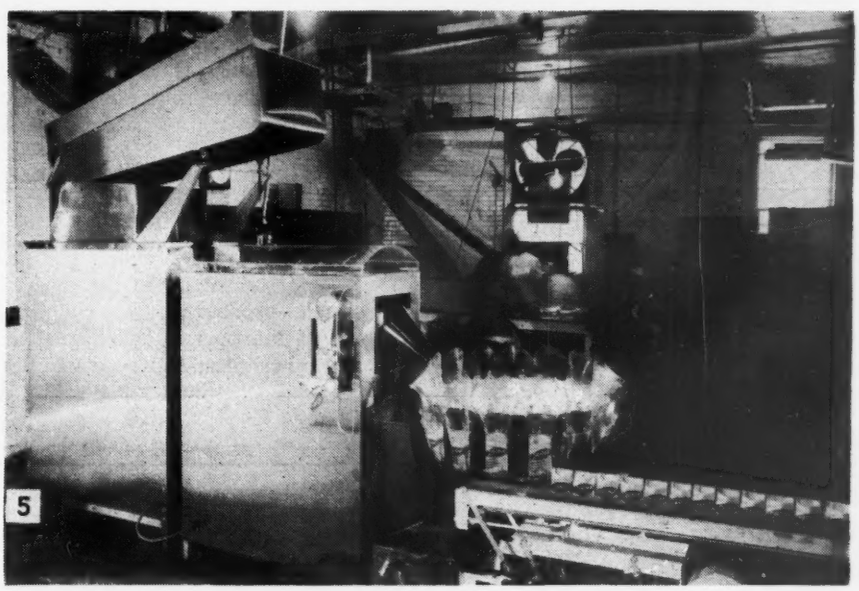

Conveyor and spout from grain elevator
225 bu. factory storage bin
Elevator to kettle
Steam jackered kettle with powered mixer
PREPARING MASA
Rotary reel washer
Stainless steel vat
Stone burr-type corn grinder

FLOW DIAGRAM of corn chip manufacture in the Dallas, Tex., Frito plant. Only manual operations required are: (1) Movement of port-

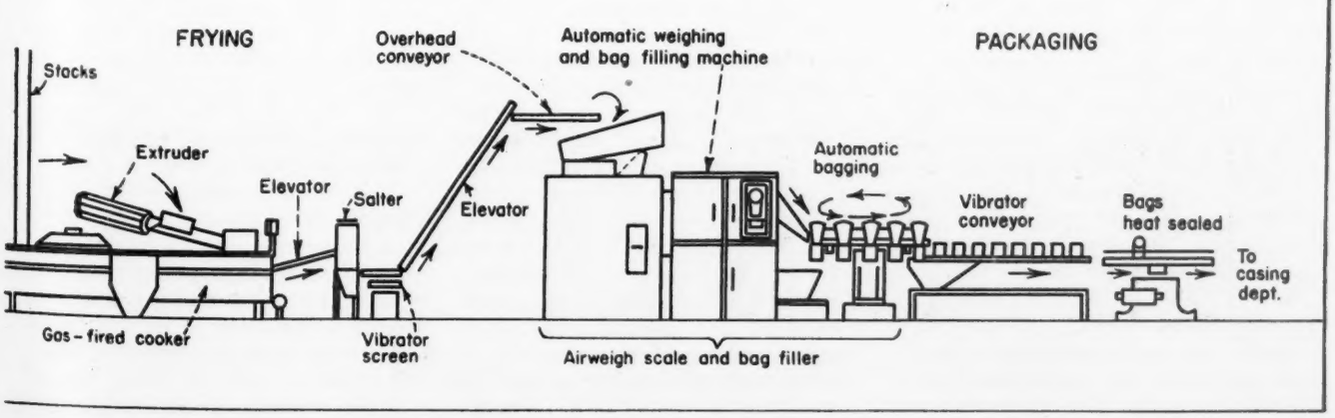
Masa is Extruded, Fried, Salted. Fritos are Weighed and Bagged



4. MASA is fed into extruder at right, and discharged in ribbons, in front of operator. Ribbons fall into vat of hot vegetable oil and are cooked. They are conveyed through cooking oil, then salted and discharged onto vibrating screen, where excess salt is removed. From the vibrator, Fritos are conveyed to the Air-weigh scaling and packaging machine.



5. AIRWEIGH weighing and bagging machine fills 1 ounce of Fritos into paraffined bag. Filled bags drop onto a vibrating conveyor which carries them to heat sealer.



able vats; (2) Transferring corn to washer; (3) Moving corn from washer to grinder, and (4) Moving loaves of masa to extruder.

China Moves to Modernize Its Food Processing

Purchases up-to-date canning, freezing and drying plant. Research pushed on use of raw materials for compact canned and dried emergency ration.

By WILBUR R. McREYNOLDS
Colonel U. S. Army, Retired

CHINA will soon benefit from the use of modern equipment for canning, freezing and drying foods as the result of a recently initiated project to develop a modern emergency ration for the Chinese soldier, sailor and air pilot.

The project is based on a report by a war committee headed by Col. Paul P. Logan, U. S. Army. The report informed the Chinese government of: (1) Available resources, (2) the lack of modern equipment, (3) the necessity for a highly nutritive ration to offset present deficiencies in soldiers' rations, and (4) the urgent need for canning, freezing or drying seasonal crops for transporting to desolate areas or to the armed forces.

The initial step in the project was the purchase of one of the most modern canning, freezing and drying plants in China—the Henningsen Produce Company's Hazelwood plant in Shanghai. This plant is being used for research and experimental development of a compact canned and dried ration for a few thousand combat soldiers. It is hoped that this research will result in the development of a highly stable, nutritive, and caloric group of food items.

The initial experiment is directed toward production of a compact ration rather than the heavier E ration of the U. S. Army. It will include: Rice, dehydrated vegetables, soup powder, soy milk powder, soy sauce powder, candies and jam paste, and one 8-oz. tall can of meat and vegetables, contained in a fibre or cotton refill container.

Products Planned

According to the complete plan, factories will be set up in the most appropriate producing areas in China. Some of the operations planned are: Can making, meat and vegetable preparation and canning, vegetable dehydration, soybean milling, egg drying and production of meat and vegetable soup powders. Candies and glazed fruits, jam paste, fish paste, hardtack bread, soy sauce, soy sauce powder and pickled vegetables will also be produced. The use of soybean products, the cooking, puffing and compressing of rice and the development of a good tasty soup powder from a mixture of dehydrated vegetables will be emphasized. Incidental operations will include the manufacture of boxes and kegs, soap, and also fire briquettes of sawdust.

Author McReynolds, Colonel U. S. Army, retired, is now in Shanghai in charge of Food Technical Engineering for the Quartermaster Experimental Factories. During the war he was Quartermaster General of the U. S. Air Forces. He was formerly in charge of the Subsistence Research Laboratory in Chicago, and instrumental in the development of type C and K rations, and quick frozen boneless meat—The Editors.

Corn Chip Business

(*Continued from Preceding Page*)

completely to insure uniform texture when the corn is ground. From the soaking vats, the corn is manually fed into the washer.

After washing, the grain is manually fed to the grinder, which reduces it to corn dough, called "masa". The grinding process is under close supervision since the texture of the masa determines, to a large extent, that of the finished product.

The masa is formed by hand, into a cylindrical shaped cartridge weighing about 20 pounds. This cartridge is fed by hand into the extruder. Two types of power are used for these extruders. Some use pneumatic, others hydraulic. The masa is extruded from slots, located around the periphery of the exit end of the press, in ribbons of predetermined width, thickness and length. As the machine automatically cuts the masa into lengths, the ribbons, about 2½ inches long, drop into hot vegetable oil in the cooking vat. This vat is heated by a gas burner, which is thermostatically controlled to insure uniform cooking temperature. A conveyor mechanism moves the corn chips through the hot oil at a rate of speed calculated for uniform cooking.

At the end of the cooking vat, the chips are removed from the hot oil by a wire mesh conveyor belt, which allows all free oil to drain off. The conveyor moves the chips through the salter and drops them onto a vibrating screen where excess salt is removed. From this screen, the cooked and salted Fritos are elevated to a conveyor.

From the overhead conveyor, the Fritos drop into the shaker-hopper of the Airweigh weighing and packaging machine. From this hopper, they are conveyed on a vibrating screen to the scale. When 1-oz. of Fritos is delivered to the scale pan, a blast of air is released which blows them through a spout into a Plexiglas hopper. This hopper is one of 12 mounted on a revolving table. Empty bags are affixed manually to the bottoms of the hoppers.

The clockwise movement of the wheel, on which these Plexiglas hoppers rotate, is coordinated with the weighing of the product. When the Fritos are blown from the scale there is a hopper in position at the spout to receive them. As each full bag reaches the carry-away conveyor a retaining clamp releases it, causing the bag to drop onto the conveyor. The vibrating movement of the conveyor shakes the product down inside the double thick paraffined bag. At the end of the conveyor operators take each bag and, after folding the top together, place it in the automatic heat sealer. The larger, 9-oz. bags are filled by hand. Sealed bags are conveyed to casting department.

At the end of each cooking period, all equipment is cleaned. The vegetable oil is filtered through a flannel cloth or a filter press. Once each week all equipment is taken apart, cleaned and sterilized with live steam. Vats are boiled with a strong caustic solution. All conveyor belts in direct contact with the product are removed, channels cleaned and belts boiled with a cleaner.

How to Select Equipment For Food Processing Plants

Part II—Practical steps to follow in setting up performance guarantees; in specifying, securing, and evaluating the bids; and finally in purchasing the new units and checking their actual performance after installation

By J. G. BROWN, Licensed Professional Engineer, New York City

EXECUTIVE approval for the purchase of new processing units marked the half-way point in our 13-step procedure for selecting and obtaining new equipment (accompanying box briefs the seven prior steps). We will now consider the concluding stages of our task.

Nominally, the final steps are: (8) Revision of the formulation of basic requirements to be met, (9) establishment of performance guarantees, (10) preparation of specifications and securing of bids, (11) evaluation of bids, (12) purchase of equipment, and (13) check-up on equipment after installation. Each will be taken up in turn—

Step 8 is an amplification of the "statement of requirements" set up in Step 3. Here, the "finishing touches" will be greatly facilitated if the written

Steps 1 Through 7

First installment of this two-part article (July FOOD INDUSTRIES) covered the following initial steps in the selection and purchase of equipment for a food plant:

(1) General discussion of requirements, (2) assignment for investigation, (3) formulation of requirements, (4) interpretation in terms of equipment, (5) estimation of costs and delivery, (6) justification of investment, and (7) presentation of the data for executive approval.

The accompanying article rounds out the procedure by detailing Steps 8 through 13.—*The Editors.*

prospectus is circulated among key personnel for additions or corrections.

Revision of the basic requirements is necessary, at this point, to cover any conditions which may have changed in the interval elapsing between Steps 3 and 8. In addition, improved ideas worthy of incorporation may have been developed.

Time now devoted to full and accurate re-formulation of this data will be exceedingly well spent. For few things are more dismaying than to have an equipment project well advanced, only to learn that important requirements have been overlooked or mis-stated, making major specification changes necessary.

Statement of Requirements

Some of the points to be included in the statement of requirements are:

1. Production rates required in: (a) Average operation, and (b) maximum and minimum operations.
2. Flexibility, which includes: (a) Suitability for batch or continuous operation, (b) adaptability to different products or processes, and (c) interchangeability of parts.
3. Exact materials of construction for: (a) Contact parts, (b) other parts, (c) external appearance (matching existing equipment), and (d) electric current characteristics.
4. Space and weight limitations, such as: (a) Elevator capacity, (b) floor load capacity, (c) clearances for installing, cleaning and servicing and (d) clearances for operating.
5. Guards and safety features.
6. Cleanability and sanitation features.[1]
7. Performance, in terms of operation or process.

There will undoubtedly be other requirements in specific cases. Therefore, the tabulation above is merely intended to illustrate basic points.

Performance Guarantees

Step No. 9 constitutes formulation of the desired performance guarantee. Such guarantees are a moot point, some equipment manufacturers even refusing to consider them. Nevertheless, from the purchaser's viewpoint, the capacity of the equipment to handle the desired load of cooling, pumping, packaging, or other essential operations, is of primary interest.

If such capacity can be guaranteed with apparatus whose fabrication involved secondary materials and workmanship, this equipment would be preferable, from a production standpoint, to a shiny, streamlined machine that cannot "deliver the goods." In any event, the guarantee should be carefully formulated to meet all requirements, and then insisted upon in subsequent specifications and purchase orders.

One advantage to formulating performance guarantees is the crystallization of ideas and requirements into concise and unequivocal language. No extraneous material can be included. No "ideal but unattainable" performance can be demanded. And no vague generalities or ambiguous conditions can be tolerated.

A second benefit is avoidance of idealistic promises by over-enthusiastic equipment salesmen. Here, no reflection upon these representatives or the equipment makers is intended. On the other hand, one might as well face the fact that some salesmen do tend to express a greater belief in the performance of their product than is merited by subsequent experience with it. Therefore, protection against possible unfortunate consequences of such experiences is only common sense.

A third benefit is the inclusion of certain significant qualifying conditions that might otherwise be overlooked. For example, cooler guarantees must be based on the unit's ability to supply a definite quantity of a certain cooling medium at a stated temperature. This might well lead to a really careful measurement of well-water volume and temperature, which until now may have only been checked superficially, or perhaps merely estimated. Although performance guarantees will have to be drawn in the light of the user's own requirements, it is well to consult with reputable equipment manufacturers. They can often contribute valuable information derived from previous experience with similar problems, or perhaps they have actual performance data developed in their pilot plant or laboratory. Sometimes such test data is based upon samples by the prospective buyer's own product.

Before leaving this important subject, some actual examples of performance guarantees with specific names omitted, may be cited—

Cooler: "Shall have a capacity for cooling 12,500 lb. of (product) per hr. from 110 deg. F. to 60 deg. F. Product must be cooled from 110 deg. F. to 64 deg. F. with about 100 gpm. of 58 deg. F. well water and from 64 deg. F. to 60 deg. F. with about 54 gpm of 34 deg. F. sweet water."

Bottle Washer: "To handle 14 oz. ketchup bottles, supplied by (three) glass companies, simultaneously at speeds from 150 to 250 bottles a min."

Evaporator: "The contractor hereby guarantees that the capacity of the apparatus covered by this contract will be such that the evaporator and contiguous equipment shall evaporate 12,000 lb. per hr. of water out of 20,000 lb. per hr. of (product) reducing it from 12.5 percent solids to 31.25 percent solids using steam at 3 psi. gage in the first effect, and operating at a vacuum of 26.5 in. Hg. in the vapor leaving the third effect, at the same time heating with vapor the feed product from 50 to 165 deg. F., thence

CHART 3.—SPECIFICATION SHEET FOR COMPETITIVE BIDS

(Suggested Form for Step No. 10)

Item no. ..... **Date** .....

Requisition no. .....

Name and type equipment desired .....

As manufactured by .....

For purpose of .....

Guaranteed capacity or specification .....

Detailed general specification .....

.....

.....

Motor and drive specification .....

Installation specification .....

Price .....

Delivery requested .....

Trial period required .....

Previous purchase order No., date and price .....

to about 210 deg. F. with steam in the recirculating preheater. All equipment shall conform to the sanitary standards of the (association) in all respects."

Net Weigher: "This machine is to handle (material), the same products as were tested and accepted by you and covered by your research test report (number), signed by your Mr. (name). This machine is to handle the aforementioned products, discharging them into Cellophane bags per samples submitted, at the following speeds: 16 oz.—25 per min. and upward; 32 oz.—20 per min. and upward. All weights are to be from the exact weight to overweight in the same percentage range of weights as shown in research test report (number). We agree to furnish sufficient material to the supply hopper of the weigher to keep a constant and uniform flow of the products to be handled."

Drawing Specifications

Step No. 10 concerns drawing specifications for competitive bids. This step is essentially a re-statement of the information developed in Step No. 8. The point here is to set up the requirements in a logical and precise manner and in terms that will be readily understood by equipment manufacturers or suppliers. If a performance guarantee has been made, then it will obviously become a part of these specifications.

Again, it is recommended that an established form be prepared to simplify this step as much as possible. Certain standard headings can be used, with space provided for the proper details of each particular case. The suggested form (see Chart 3) may be modified to suit different conditions prevailing in various companies.

These specifications must next be submitted to equipment suppliers with requests for their recommendations, proposals, prices and delivery information.

A word of caution: The specifications should, wherever possible, permit more than one bid. There are not, after all, many operations that can be carried out exclusively by equipment made by one company. Consequently, some flexibility in specifications is desirable. For example, a fork-lift truck may be under consideration, and for certain reasons an electric truck may be favored over gas (or vice versa). Yet, to draw the specification so as to require hydraulic lift would greatly limit the final choice of equipment. "Hydraulic or mechanical lift" would permit more bids, resulting in a broader selection. In turn, other advantages, such as quicker delivery, may be gained.

Comparative Annual Evaporator Costs

(Reference for Step No. 11)

	One effect	Two effect	Three effect
Steam, evaporator	$21,200	$10,200	$6,650
Steam, preheater	5,280	1,235	1,370
Product loss	980	1,995	1,995
Condenser water	1,004	379	131
Cleaning cost	2,622	2,140	2,622
Maintenance	600	400	400
Direct labor	12,240	6,120	6,120
Total operating cost	$43,926	$22,469	$19,288
Capital charges	590	7,697	8,384
Grand total annual cost	$44,516	$30,166	$27,672

Evaluating the Proposals

Step No. 11 follows receipt of bids and proposals from equipment suppliers and it consists of evaluating the different proposals in order to determine the equipment best suited for the job.[2] This is not an easy task, for bids will often emphasize different features, hence direct comparisons will be difficult. This step, however, is the key to the whole procedure. Any serious oversight at this point may lead to years of "living with" equipment that should not have been selected.

How can a just evaluation be made? One answer is to use the check-chart method. Starting with the original specifications, each pertinent feature of the equipment and its performance is set down in a given order. Then, each proposal is analyzed, in turn, into the same features, and these are set down in the same order.

If the equipment is not too complex, and the number of bids not great, this may all be done on a single large sheet. Such an analysis will frequently eliminate several proposals quickly, narrowing the field of selection to two or three outstanding pieces of equipment. It would, in fact, be unusual if this winnowing did not occur.

Finally, it is pertinent in many cases to make a second form of analysis—a comparative capital and operating cost analysis. The following brief explanations will illustrate the method—

1. *Productive capacity:* All equipment being considered may meet the performance stated in the specifications, but some may actually exceed it. Other things being equal, a higher-capacity machine would be preferred, since it should make for lower unit costs.

2. *Labor requirements:* The aspects here can be rather "tricky". Direct labor may be fairly easy to compare. But there may be, say, construction features that indicate differences in cleaning or maintenance requirements, with resulting differences in indirect labor needs.

3. *Utility requirements:* Two heat exchangers may be offered to handle the same load, and initial costs may be comparable. If one, because of more efficient design, requires less heat transfer medium, its operating cost will be less over the life of the equipment. This might be the deciding factor. Another example might be an over-motored machine — meaning lower power-factor, lower efficiency, and greater electric energy cost.

4. *Installation:* A large and cumbersome machine will generally require more rigging and heavier foundations. This point might be important in reaching a decision if other factors are similar. Piping, wiring and auxiliaries should also receive consideration. In an actual instance, two coolers quoted for the same application were found to differ markedly in installation cost because only one had all necessary water spray nozzles.

Perhaps this sort of cost comparison can best be illustrated in tabular form. Our accompanying table, "Comparative Annual Evaporator Costs", covers several proposed evaporators, all having the same rated capacity for the same application. This table shows, in striking fashion, the importance of operating costs in selection of equipment. In this case, the highest investment and capital charges result in lowest over-all costs operating efficiencies.

If all of the foregoing steps have been followed, the decision on what equipment to buy can now be made with reasonable assurance that: (1) The interests of all concerned have been given proper consideration; (2) the use of the proposed equipment has been carefully stated and its need definitely proved; (3) it has been designed to meet all working requirements, including performance guarantees; and (4) it represents the best equipment available for the intended purpose.

Ordering the Equipment

With the choice indicated, it is well to inform all who are directly concerned (as listed in the discussion of Step No. 1), telling them what equipment is to be ordered and why.

In addition, final check-ups must be made to be sure that no possible objections have been overlooked. This is

(*Continued on page* 199)

BAKE-SHOPS above are typical of the standard layout for continuous doughnut production in the Mayflower's chain of 22 plants.

These Bakeries Benefit From Standard Cost Control

Exact causes of any increased operating expenditures are readily determined by comparative study of actual and standard costs

By HOWARD S. STEVENSON, Industrial Engineer
Mayflower Doughnut Corp., New York City

SHOP production performance is now measured on a basis of comparison of actual and standard costs by the Mayflower Doughnut Corp., New York City. The selling price of the product has been completely divorced from the cost picture.

This approach is contrary to general practice in the baking industry, where it has been customary to look at cost as a percentage of sales. The conventional method had been in effect at Mayflower since the company's inception. Recently, however, we decided that this was the "horse and buggy" way of determining whether costs are too high, too low, or satisfactory.

For illustration, if a package of a dozen doughnuts sells net to a customer for 15c and the ingredient cost is 7½c and labor 1½c, then ingredient cost is, of course, 50 percent of sales, and labor 10 percent. If, however, the selling price increases, the ingredient and labor percentage automatically is reduced with no effort on the part of management. Conversely, if the selling price is reduced, these percentages rise through no fault of management.

Thus the old "percentage of sales" method depends on a combination of two variables, and control of costs is too complex when it is so difficult to place the finger on the factors.

"Yardstick" Comparisons Give Speedy Check on Expenses

Mayflower Doughnut Corp. Employs These Comprehensive Data in Determining Precise Production Costs

INGREDIENTS	Unit Price (per lb.)	Day Quan. (lb.)	Day Amt. ($)	Month to Date Quan. (lb.)	Month to Date Amt. ($)
Doughnut Mixes	$.136143	1,310	178.35	36,805	5,010.73
	.136143	700	95.30	13,355	1,818.21
Shugarwite	.125	270	33.75	6,930	866.28
Frying Compound	.26988	434	117.13	12,234	3,301.71
Chocolate	.27373	337	92.25	6,794	1,856.97
Total Ingredients Cost			516.78		12,853.90

PACKAGING MATERIALS	Quan. (No.)	Amt. ($)	Quan. (No.)	Amt. ($)
Doughnut Boxes (all types)	6,865	49.86	159,701	1,395.34
Shipping Cartons	50	10.60	1,750	371.00
Liners	5 lb.	.85	68 lb.	14.07
Tape	.....	.....	25	16.50
Total Packaging Cost		61.31		1,796.91

PAYROLL	Week	Month To Date
Direct	$60.00	$1,421.63
Indirect	50.00	820.11
Total Payroll	$110.00	$2,241.74

EXPENSES		
Special Printing	5.00	120.00
Repairs	10.00	86.00
Traveling	1.00	5.00
Tel. Tel	2.00	31.00
Postage	1.00	11.00
Stationery and Printing	3.00	50.00
Freight and Cartage	3.00	46.00
Electricity	8.00	154.00
Water	1.00	15.00
Gas	6.00	132.00
Cleaning Agents	5.00	21.00
Garbage Removal	.....	3.00
Laundry	3.00	54.00
Window Cleaning	1.00	16.00
Miscellaneous	2.00	16.00
Sub Total	$51.00	$760.00
Total Expense	51.00	760.00
Total Controllables	739.09	17,652.55

ACCUMULATIVE COMPARISON OF COST

	Actual To Date	Standard
Ingredient	$12,854	$13,096
Packaging	1,797	1,793
Payroll	2,242	2,490
Expense	760	1,014
Total	17,653	18,393

YIELD
Doughnuts Per Lb. Used To Date

Flour	23.8
Shortening	2.0
Sugar	1.8
Chocolate	3.1

DAILY PRODUCTION REPORT

PACKAGE	Guar. Wt. (oz./doz.)	Type Do'nut	Wt. at Mach. (oz.)	No. of Cutters	No. Cuts (per min.)	Lb. Fl.	Lb. Fat	Lb. Sug.	Dozens Today	Dozens To Date
Doz.	12	Sugar	11	10	20	.4625	.1063	.1063	801	37,063
½ Doz.	14	Sugar	12½	10	20	.5188	.1156	.1156	40	1,052½
Doz.	24	Plain	25	5	15	1.0375	.2063	.....	88	1,798
Doz.	24	Sugar	22	5	15	.9250	.1984	.1938	110	2,059
¼ Doz.	15	Ball S	14½	15	15	.5875	.1563	.1438	1,197½	22,758½
½ Doz.	13½	Choc.	10½	15	20	.4438	.1031	.2188	1,636½	34,626½
Totals									3,873	99,357½

AMOUNT THAT SHOULD HAVE BEEN USED

	Flour (lb.) Today	Flour (lb.) To Date	Fat (lb.) Today	Fat (lb.) To Date	Sugar (lb.) Today	Sugar (lb.) To Date
	370	17,141	85	3,940	85	3,940
	21	545	5	121	5	121
	91	1,864	18	371	....	398
	102	1,905	22	409	21	398
	703	13,370	187	3,556	172	3,272
	726	15,366	169	3,570	....	....
Actual Amounts Used	2,013	50,191	486	11,967	283	7,731
	2,010	50,160	434	12,234	270	6,930
Gain or loss in pounds (loss in parentheses)	3	31	52	(267)	13	801
Percent gain or loss (loss in parentheses)	.1%	.06%	10.7%	(2.2%)	4.6%	10.4%

It has been the feeling that if labor costs were under 10 percent of the sales dollar, then the plant was operating satisfactorily, even though it may have been quite obvious that the plant was overstaffed. This viewpoint has cost untold dollars—by ignoring the obvious, and at the same time being content with an arbitrary percentage.

Nearly everyone is familiar with the use of standard costs and their value in giving management control over the operating or production side of the business. Applied to the doughnut bakery, the method works as follows:

The direct shop costs cover ingredients, packaging material, labor, and such operating expenses as repairs, electricity, gas, laundry, and the like.

A chart of ingredient consumption has been designed that specifies the standard proportions of doughnut mix, shortening, sugar and chocolate for doughnuts of various weights. From this, we are able to determine the ingredient utilization — whether the doughnuts are on weight, whether we are conserving on shortening, etc.

A standard 1 percent loss of doughnut cartons and corrugated cartons is allowed. Anything in excess of this entails a packaging-material cost considered inordinate.

Man-hours of labor required have been standardized through time studies, and personnel is allowed accordingly, on a basis of volume of a given shop. Factors of demand vs. shop capacity determine when overtime is necessary.

This standard personnel setup is converted into a standard dollar payroll—by extension of hours by the contract hourly rate, managers' salary, etc. Thus, for a volume of so many thousand dozen doughnuts, we know it should require a certain number of employees with a total weekly payroll of so much. A check against actual payrolls will reveal whether the shop is performing above or below standard.

In regard to operating expenses, a shop budget is established, allowing the shop to expend so much to cover electricity, gas, repairs, laundry, window cleaning, telephone and telegraph, and office supplies. This budget is compared monthly with actual operating expenses. Items exceeding the budget must be explained in detail.

Adding it all up, we have a comprehensive picture of what to expect in the way of manufacturing costs, and we can tell at a glance whether these costs are being exceeded or bettered. We give no consideration whatever to selling prices—which are to be determined as a separate phase.

Now, before an item is sold, we know our standard cost, and we can determine the selling price from that. Or, in the case of competitive pricing, we know beforehand what profit or loss to expect from the selling price. If management chooses to offer an item at a loss, for competitive reasons, it is all carefully accounted. The shop manager is not held responsible for an "unexpected loss"—since the "unexpected" is avoided.

From this point on, other favorable projects may be developed, such as a plan for a monthly bonus for managers, predicated on savings against standard. A program of methods and a time study to determine the "one best way" should then be installed to keep the standards up to date.

Actual control is exercised through a periodical report issued by the individual shops (sample portions of which are reproduced in this article). The report shows the actual money spent in each category for the period covered, compared with the standard costs allowered for the period, thus:

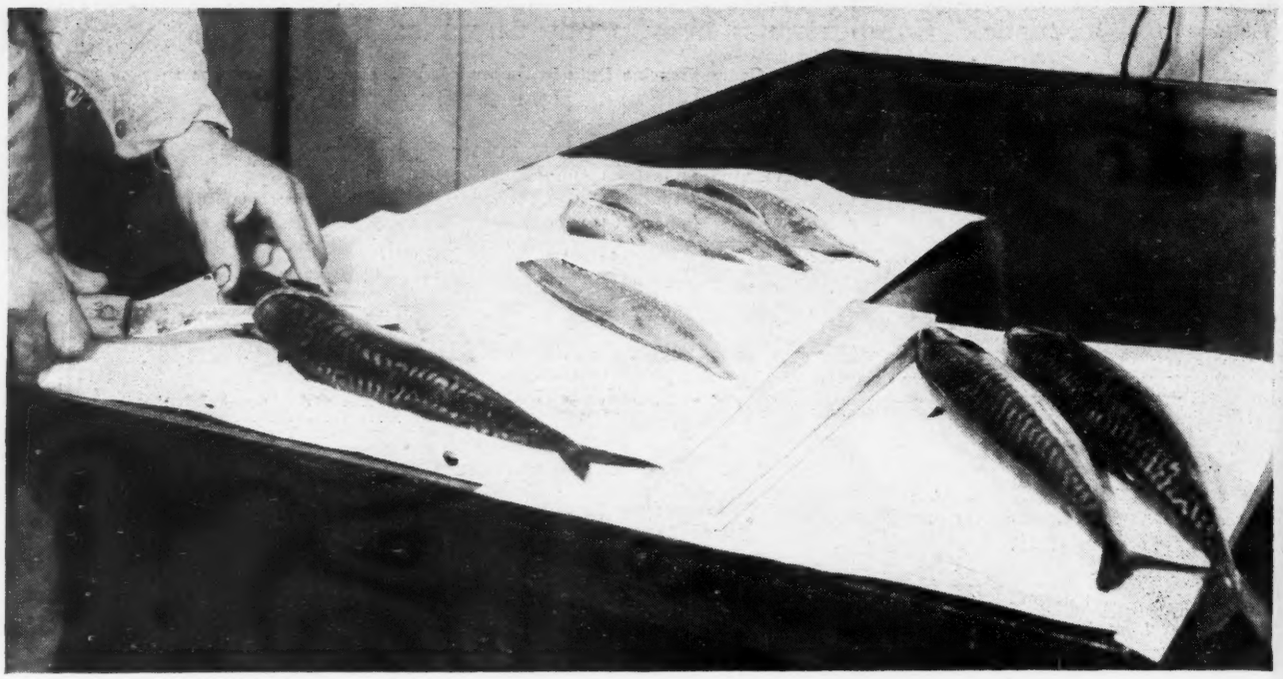
Ingredients: Actual $12,492, Standard $13,342; Savings $850.

Packaging Material: Actual $1,392, Standard $1,398; Savings $6.

Payroll: Actual $1,743, Standard $1,518; Loss $225.

Operating Expenses: Actual $695, Standard $750; Savings $55.

(*Continued on page* 206)



Curb Mackerel Fillet Rancidity . . .

Combination of NDGA-in-Oil and Irish moss extractive proves efficacy as

By L. S. STOLOFF, Krim-Ko Corp., Chicago, Illinois
J. F. PUNCOCHAR, U. S. Fish & Wildlife Service, Boston, and
H. E. CROWTHER, Atlantic Coast Fisheries Co., Boston

A NEW TECHNIC has been developed for applying antioxidants in order to retard rancidity in frozen mackerel fillets. And favorable possibilities are seen for commercial application of the method.

This new procedure for prolonging the frozen storage life of the fish found its basis in results of past investigations, which employed four different approaches: (1) Low storage temperatures; (2) use of antioxidants; (3) use of vegetable oils containing antioxidants as dips, and (4) coating with solutions, such as a mixture of gelatin, glycerine and water.

Working along the most advantageous paths opened by these studies, a simplified processing idea took shape. This was to dip the fillets in a viscous coating material which would act as a carrier for either water-soluble or oil-soluble antioxidants. An Irish moss extractive was selected as the material that would act as the carrier.

To review the question: The fat content of this fish has posed troublesome problems for processors wishing to freeze it in season and store it successfully for later sales. True, some mackerel is frozen in the round, but with dubious success.

The mackerel fillets are more economical to freeze and store than the whole fish. Furthermore, fillets can be merchandised with more consumer appeal. But according to the trade, frozen mackerel fillets cannot be kept in storage more than three months. And this period is too short for favorable commercial operations.

Reason for the loss in quality during storage is the development of rancidity in the fish oil, particularly that exposed to the air. Consequently, the idea of using antioxidants dispersed in a viscous carrier was conceived as a means of retarding this rancidity, thereby extending the storage life of frozen mackerel fillets packed in unit sales containers.

Prior Studies

The effect of low temperatures on retarding rancidity in frozen salmon and herring was investigated by Tarr[1]. He found that rancidity took place slowly at — 18.4 deg F. and somewhat more rapidly at —4.0 deg. F. Storage for one month or less at 14 deg. F., on the other hand, usually led to marked oxidation of the fat. The commercial storage temperature commonly used is 0 deg. F. It is reported that temperatures appreciably below this would be impractical.

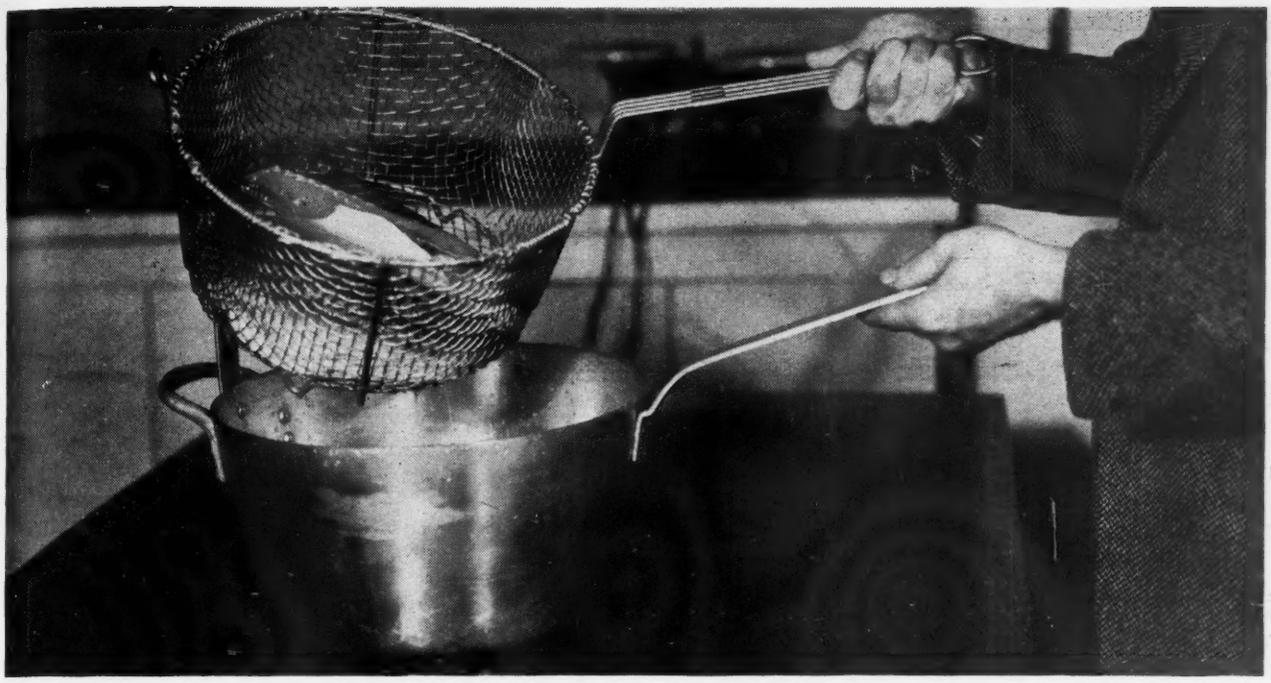
Tarr also investigated the effect of antioxidants in retarding rancidity. He found that ethyl, n-propyl, n-butyl and hexyl gallates delayed the onset of rancidity. While sodium gallate, ethanol ammonium gallate (0.02 percent), dodecyl thiodipropionate, thiourea, citric acid and tartaric acid were ineffective. Ascorbic acid (0.5 percent in minced flesh) proved successful.

Silver[2] developed a method for retarding oxidative rancidity in brine-cured mackerel. This was done by dipping the cured mackerel, before shorage, in cocoanut oil containing 0.2 percent nordihydroguaiaretic acid (NDGA).

Why Coating Was Used

Preliminary work was carried out by the U. S. Fish & Wildlife Service[3] involving coating of smelts with a mixture of gelatin, glycerine and water. The results indicated that the fish were adequately protected against deterioration and probably against the development of rancidity.

The authors of this article felt that a viscous solution containing an anti-



. . . With New Dip-and-Coat Technic

coating solution in special tests to extend storage life of frozen fish

oxidant would be the most desirable for extending the storage life of frozen mackerel fillets. They reasoned that the viscous carrier would hold more of the antioxidant in contact with the fillets, thereby aiding in prolonging storage life. Furthermore, a viscous coating on the fillets would seal air from the oil on the surface of the fillets.

Material selected as a coating was an aqueous solution of refined Irish moss extractive (Krim-Ko-Gel). Such an extractive is an effective emulsifying agent and protective colloid, thus permitting the use of water-soluble or water-insoluble agents. The colloidal agent prevents the formation of pockets of free oil, and the natural occurring oils in the flesh of the fish can be more readily reached by the antioxidant dispersed in water.

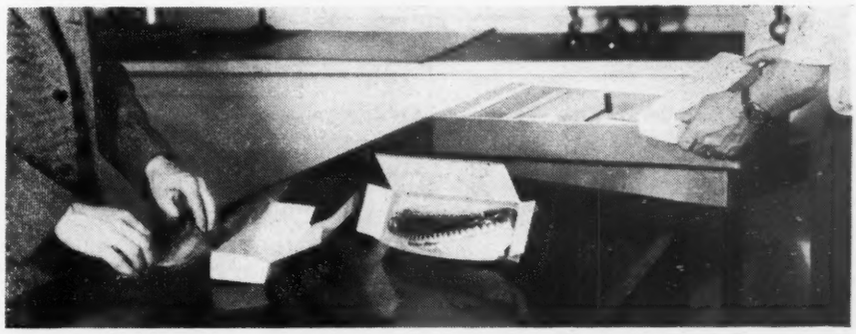
The antioxidants used in the dipping solutions are listed in Table I. Cottonseed oil (refined) containing 0.2 percent NDGA was included for comparison. To check on possible added benefits from multiple dipping, the NDGA-in-oil coating was covered with a solution of Irish moss extractive containing ascorbic acid and also with a plain solution of refined Irish moss extractive. Untreated fillets, and fillets treated with the extractive solution (without antioxidant), were used as controls.

Preparing the Samples

The mackerel used in the tests were less than 12 hr. old when purchased. They were an early season lean-meat lot of fairly large fish (1.5 lb.), averaging 4.6 percent fat. Before processing, the fish were kept in cold storage (28 deg. F.) for several hours.

The process consisted of filleting, washing, draining, weighing, dipping, draining, wrapping and packaging. Sufficient help was employed to simulate commercial line operations. Fillets were cut from the round fish, rapidly washed in fresh tap water to remove the excess blood, drained, weighed into approximately 1-lb. portions, dipped into the solution of Irish moss extractive containing the antioxidant, and finally drained for approximately 15 sec. on a stainless steel screen. Each lot consisted of two to three mackerel fillets.

After dipping and draining, the fillets were wrapped in cellophane, with the aid of a mold, before being placed in individual 1-lb. type waxed cardboard boxes. Twelve 1-lb. packages were prepared for each antioxidant dip and controls so that examinations could be made over extended storage periods. Thirteen packages, one package for each of the eleven treatments and one each for the two controls, were packed together in waxed master cartons, and in these containers the contents were frozen in an air blast freezer (−25 deg. F.) be-



IN TEST OPERATIONS, treated mackerel fillets were wrapped in cellophane (left), placed in cardboard cartons (center), and packed in waxed master containers (right).

Company Tried These Experimental Dips . . .

Table I—Solutions for Dipping Mackerel Fillets

Antioxidant	Source	Primary solution, percent	Final concentration in Irish moss extractive,[1] percent
1. None (control)	———	———	——
2. Irish moss extractive (control)	Refined Irish moss, Krim-Ko Co., New Bedford, Mass.	1.0 in water	——
3. Ascorbic acid	Fine, granular ascorbic acid USP Hoffman-LaRoche, Inc., Nutley, N. J.	4.0 in water	0.2
4. Gallic acid	Powdered reagent grade gallic acid, Merck & Co., Inc., Rahway, N. J.	2.0 in warm water	0.1
5. Propyl gallate	Powdered propyl gallate, C. D. Bittenbender, U. S. Fish & Wild Ser.	2.0 in warm ethanol	0.1
6. Thiodipropionic acid	Powdered thiodipropionic acid lot A-6530 (b), E. I. du Pont de Nemours, & Co., Wilmington, Del.	2.0 in warm ethanol	0.1
7. Gum guaiac	Powdered gum guaiac technical grade, Central Scientific Co., Chicago, Ill.	4.0 in warm ethanol	0.2
8. Lecithin	Soybean lecithin grade TS containing 65% lecithin, American Lecithin Co., Inc., Elmhurst, L. I.	4.0 in warm ethanol	0.2
9. Lecithin & ascorbic acid	(Same as No. 3 & 8)	(Same as above for individual chemicals)	0.1 of each
10. NDGA (nordihydroguaiaretic acid)	Crystalline NDGA, Nordigard Corp., Chicago, Ill.	0.2 in hot ethanol	0.1
11. NDGA in cottonseed oil covered with Irish moss extractive solution	(Same as No. 2 and 10)	(Same as for No. 2 and 13)	
12. NDGA in cottonseed oil with ascorbic acid in Irish moss extractive	(Same as No. 10, 2 & 3)	(Same as for No. 3 and 13)	
13. NDGA in cottonseed oil	(Same as No. 10)	0.2 percent in refined cottonseed oil	

[1] A 1-percent solution of Irish moss extractive (Krim-Ko) in water. In all cases, primary solution was dispersed in sufficient extractive to give final concentrations indicated. Warming and rapid agitation were required for proper dispersion of those materials dissolved initially in ethanol.

fore being placed in commercial cold storage (0 deg. F.).*

At approximately monthly intervals, a master carton was removed from storage for inspection and the contents were tested. The 13 individual packages were placed on a bench, where the fish were thawed by an electric fan. Then the packages were opened and the contents observed for appearance and odor. Then examinations for appearance, odor and flavor were made on a cooked fillet from each package. These fillets were baked in individual pans for 20 min. at 340 deg. F. Before observations were made, all identifying marks were removed, and a number was assigned serially to each package according to its random removal from the master cartons.

The testing panel consisted of three to five experienced fish tasters. Observations were made for qualities that would render the product unfit for customer acceptance. Each member of the panel made his observations first on the thawed, then on the cooked samples. After all had completed a series of observations, notes were compared for each sample and a consensus was made, averaging the opinions.

The untreated fillets (control) were unacceptable after the third month, while the Irish moss extractive solution without antioxidant (control)

* Grateful acknowledgment is made to the Commonwealth Ice & Cold Storage Co., Boston, Mass., for its aid it this portion of the study.

(*Continued on page* 208)

. . . And Got Practical, Fillet-Keeping Data

Table II—Summary of Effect of Antioxidant Dips on Keeping Quality of Mackerel Fillets During Frozen Storage

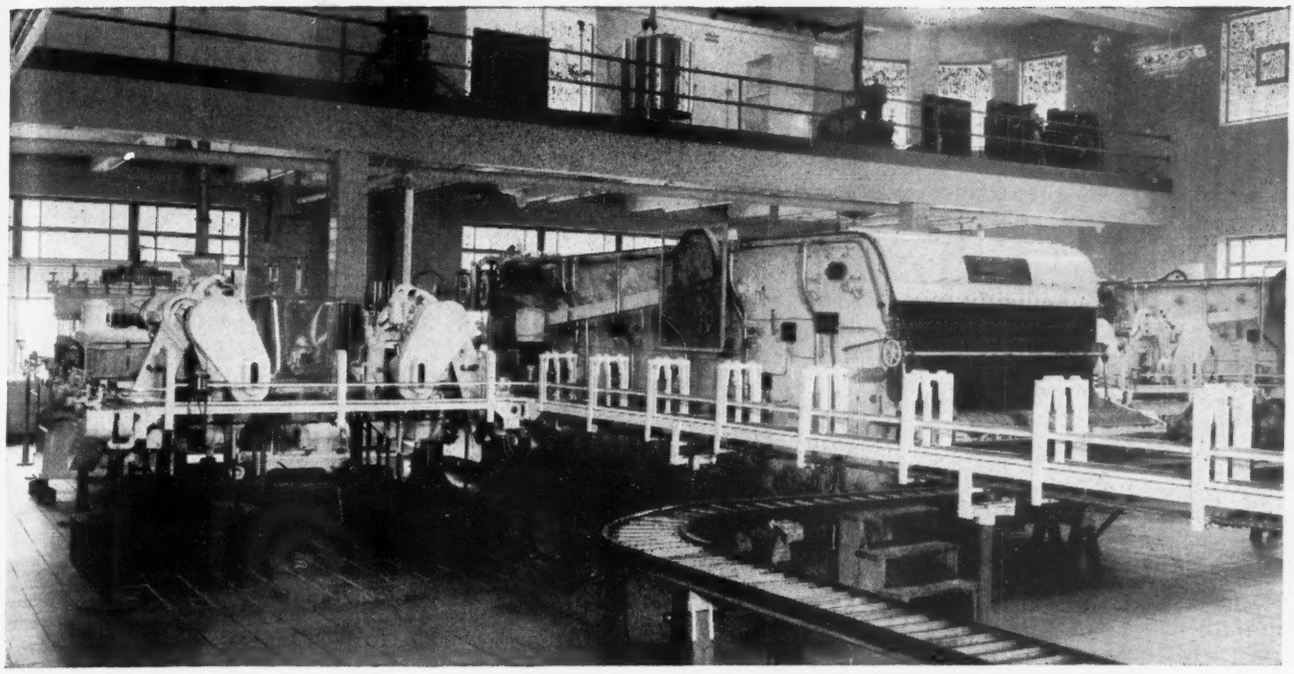
(Key—(E) *Excellent:* Flavor, odor and color of fresh mackerel fillets; *Good:* Very slight decrease in quality; *Fair:* Slight decrease in quality; *Poor:* Definitely lower quality; and *Bad:* Very poor quality. *Note:* More detailed information on condition of fillets is available from authors.

Treatment		Number of days of storage: 34	60	92	126	163	190	225	254	282	317	388
1. Untreated control	Thawed	(E)	(E)	Poor	Poor	Fair	Poor	Poor	Fair	Bad	Bad	Bad
	Cooked	Good	(E)	Poor	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Bad
2. Irish moss extractive solution control (1.0%)	Thawed	(E)	(E)	Fair	(E)	Good	Poor	Fair	Poor	Fair	Fair	Fair
	Cooked	(E)	(E)	(E)	(E)	(E)	Fair	Poor	Poor	Fair	(E)	Fair
3. Ascorbic acid (0.2%)[1]	Thawed	(E)	Good	Good	(E)	Fair	Fair	Fair	Fair	Good	Good	(E)
	Cooked	(E)	(E)	(E)	(E)	Poor	(E)	Fair	Fair	(E)	(E)	(E)
4. Gallic acid (0.1%)[1]	Thawed	(E)	(E)	Good	(E)	(E)	Fair	Fair	Fair	Fair	Fair	Poor
	Cooked	Good	(E)	(E)	(E)	(E)	(E)	(E)	Poor	(E)	Poor	Fair
5. Propyl gallate (0.1%)[1]	Thawed	(E)	Fair	Good	(E)	Fair	Fair	Fair	Fair	Good	Fair	Fair
	Cooked	Good	(E)	(E)	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor
6. Thiodipropionic acid (0.1%)[1]	Thawed	Poor	Good	Poor	Poor	Bad	Bad	Bad	Bad	Bad	Bad	Bad
	Cooked	Fair	Poor	Poor	Poor	Poor	Bad	Bad	Bad	Bad	Bad	Bad
7. Gum guaiac (0.2%)[1]	Thawed	(E)	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Bad-Smoky
	Cooked	Smoky[3]	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Smoky	Bad-Smoky
8. Lecithin (0.2%)[1]	Thawed	(E)	Good	(E)	Fair	Poor	Poor	Poor	Poor	Poor	Fair	Poor
	Cooked	Poor	(E)	(E)	Poor	Poor	Poor	Fair	Poor	Bad	Bad	Bad
9. Lecithin (0.1%) plus ascorbic acid (0.1%)[1]	Thawed	Good	(E)	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor
	Cooked	Good	(E)	Good	Poor	Poor	Poor	Poor	Poor	Fair	Poor	Bad
10. NDGA (0.01%)[1]	Thawed	(E)	(E)	Poor	Fair	Fair	Poor	Fair	Poor	Fair	Poor	Bad
	Cooked	Fair	(E)	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Poor
11. NDGA (0.2%) in oil[2] covered with Irish moss solution[1]	Thawed	Fair	(E)	(E)	(E)	(E)	Poor	Good	Poor	Fair	Fair	(E)
	Cooked	Good	(E)	Good	(E)	(E)	Fair	(E)	Fair	Fair	Fair	Fair
12. NDGA (0.2%) in oil[2] covered with ascorbic acid (0.2%)[1]	Thawed	(E)	(E)	(E)	(E)	(E)	Good	Good	(E)	Fair	(E)	Fair
	Cooked	Good	(E)	(E)	(E)	(E)	(E)	(E)	Poor	Poor	(E)	(E)
13. NDGA (0.2%) in oil[2]	Thawed	(E)	(E)	(E)	(E)	(E)	(E)	Good	Poor	Poor	Bad	Good
	Cooked	(E)	Good	(E)	Good	(E)	(E)	(E)	Poor	Poor	Poor	Fair

[1] Concentration as dissolved in approximate 1% Irish moss extractive solution.
[2] Concentration as dissolved in cottonseed oil.
[3] Smoky odor and flavor masked change in quality.

CHECK of these findings indicated best results with ascorbic acid (Dip. 3), gallic acid (Dip. 4), and NDGA-in-oil (Dips 11, 12 and 13).

A SPECIAL FOOD INDUSTRIES REPORT...



Modern Practices In Carbonated Beverage Plants

By HENRY E. MEDBERY
Technical Service Director
American Bottlers
of Carbonated Beverages
Washington, D. C.

Detailed here are the best methods and most recent developments in the production of soft drinks. Bottlers: Check your operations against those described here. Other food processors: You are invited to "borrow" adaptable practices from this efficient industry.

SYSTEMATIC study, scientific research and technical development have led to the achievement of easier operation, better products and greater profits in today's carbonated beverage industry.

Engineering, chemistry, bacteriology—all have played important roles in this progress. And the impetus was the highly competitive nature of the business, together with the great strides made in food processing technology in recent years.

The sanitation standards of the bottled carbonated beverage industry have won high rank in the food processing field. These standards have been established as a result of the cooperative efforts of research investigators, progressive bottlers, and manufacturers of the many types of equipment, raw materials and supplies used in the production of high-quality soft drinks.

More than 6,500 soft drink bottling plants are now operating in the United States. Membership in the industry's trade association — the American Bottlers of Carbonated Beverages — is maintained by 4,300 such plants. They account for more than 70 percent of the industry's total production. One of the requisites for ABCB membership is that the plant shall subscribe to a "Code of Ethics", consisting of five fundamental "rules for cleanliness and sanitation." These rules are:

1. General appearance of the building must be neat. Bottling shop at all times to be kept clean and well-ventilated. Floors to be of material impervious to water and to be flushed daily. Sirup room to be clean, well ventilated and properly screened. Lavatories, toilets, etc., to be kept clean and located in separate rooms from main bottling shop.

2. All machinery and conveyors, tanks, crocks and pipe lines, or containers of any description, to be kept in a clean, sanitary condition.

3. All bottles to be properly sterilized before filling. Crowns, or any material that comes in contact with the beverage, to be kept in a clean, sanitary condition.

4. All products used in manufacturing, such as extracts or flavors, sugar or sirup, color, water, etc., to be pure and kept free from contamination. All Federal and State sanitary and pure food laws to be complied with.

5. All employees in bottling shop to be neat and clean, and no one known to

have a contagious or infectious disease is to be employed.

Special Machinery Used

Several of the process steps in the manufacture of bottled carbonated beverages require specially constructed machinery. Since the beverage is a food product, care must be exercised in its preparation so that the product may be clean and sanitary.

The industry ranks as one of the most highly mechanized in the country, every step in the manufacturing and bottling process being handled by machinery. Bottles are not touched by hand from the time they are fed into the washer until they appear at the end of the filling line, capped, labeled and ready for delivery to retail outlets. Moreover, units which lift the empty bottles from the incoming cases and deposit them on conveyor chains leading to the bottle washer, are already being tried out. In addition, automatic case packers for filled bottles are now a reality, though they are not yet in general use.

The manner in which the various soft-drink ingredients are gathered together to make the finished product is shown in the accompanying flow chart. These ingredients—sirup, flavor and a suitable acid (generally citric)—are then blended, a measured amount delivered to each bottle, and the bottle filled with highly purified carbonated water. Bottles are of the refillable type, being used many times, after thorough cleansing and sterilizing.

After the bottle has been filled, a cork-lined metal crown cap is pressed over the top. The completed bottle is then labeled if desired, placed in wooden cases or paper-board cartons, and either transported to the storage area or loaded directly onto trucks for delivery to customers.

Sirups Prepared

Only high quality dry or liquid sugars are used in making the sirups. Cane or beet sugar is equally satisfactory, and a percentage of dextrose is becoming increasingly popular for use in certain types of beverages. Levulose, lactose, maltose, and other sugars, are adaptable but not widely used, since they are not commercially economical. The density of the sirup varies from 26 to 32 deg. Baume, depending on the bottler's choice, and the density and strength of the flavoring substances or concentrates.

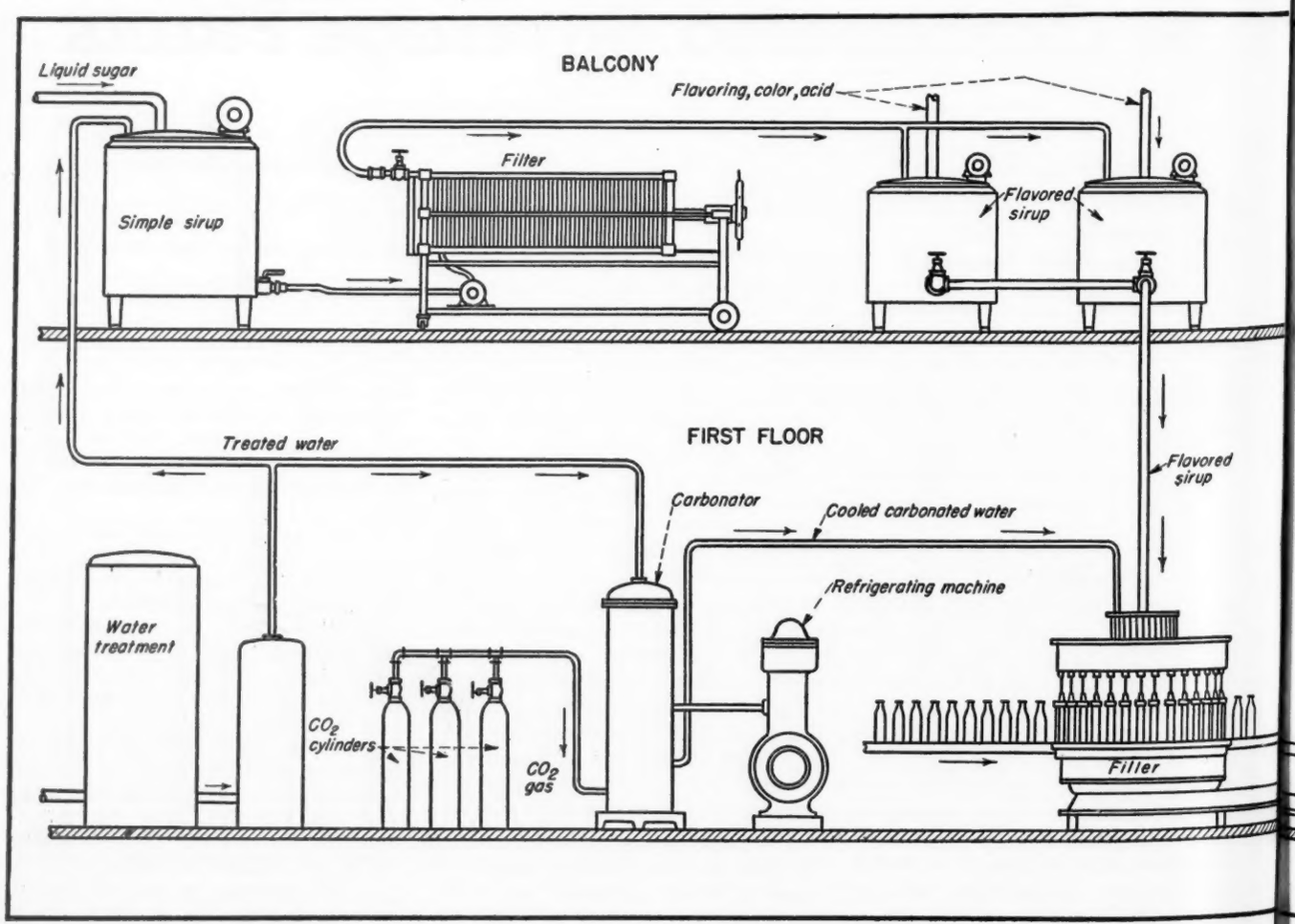
Flavoring materials are generally alcoholic extracts, water solutions or emulsions made from the aromatic portions of many roots, barks, herbs or berries. Natural fruit juices are also used, as are artificial flavoring compounds.

Flavoring Added

In the early days of the industry, many bottlers prepared their own flavors, spending considerable time and effort in compounding new and distinct ones.

The general trend today, however, is to use flavoring ingredients compounded and blended in the most modern and scientific manner. By so doing, uniformity of product is more easily maintained. Trained flavor-chemists provide uniform products, whose ingredients are properly balanced to give better flavors of a quality not generally attained by non-specialists in the field. The flavoring industry today is a sizable and flourishing segment of the large and rapidly expanding food products field.

Flavored sirups are made more palatable by the addition of edible acids made from citrus fruit, or by the fermentation of molasses. Phosphoric acid is used in most cola-type beverages. Acid, plus carbon dioxide in the carbonated water, gives to the beverage its character-



istic "zip". Additional color is obtained by the use of caramel or certified food colors.

Liquid Sugar Used

The two sirup-making steps—one for simple sirup* and one for flavored sirup — may be carried out separately, or together in the same vessel, depending on preference or plant facilities. The two-step process allows larger amounts of sirup to be prepared, or delivered to the plant, at one time. In large plants in metropolitan areas, where liquid sugar is used, this method is preferable. But large storage tanks are required, since for economy liquid sugar is delivered in tank cars or trucks direct from the sugar refinery to the bottling plant.

For preparing the flavored sirup in one batch, less equipment is required. This method is more adaptable to small plants, especially in rural communities, although liquid sugar is currently available in No. 10 cans and in 55-gal. drums.

The use of liquid sugar has certain advantages. But there are some disadvantages. Liquid sugar may be purchased at a price differential of approximately 15c. per 100 lb. less than dry sugar, on the basis of solids content. It does away with the handling of 100-lb. bags of dry sugar, thus eliminating considerable labor. It also eliminates the sirup mixing process, since liquid sugar may be metered to the blending tanks by the turn of a valve.

These advantages are discounted by the additional expense required for the installation of storage tanks of adequate size to handle large volumes. The chief disadvantage, however, lies in the increased likelihood of yeast contamination. particularly in the summer season.

In the case of certain beverages which are nationally known and sold in all parts of the country, completely flavored sirups are prepared in central plants. From these special plants, the sirups are shipped in wooden or suitable metal barrels to the individual bottling plants where the finished beverage is prepared. In such instances, the sirup is pumped from the barrels through filters to feed tanks. From here it is drawn into the bottles, carbonated water is added and the bottles capped to complete the filling operation.

Powdered Flavors

It is reported that one large international organization has developed a process for reducing the flavoring extract to a powder form for shipment abroad. Transportation charges are thus reduced, and the company is able to offer its carbonated beverages, manufactured and bottled in local markets throughout the world, at prices comparable to that paid for the same beverages in this country. The taste and other qualities are likewise uniform wherever bottled.

Tanks and other vessels used in sirup manufacture may vary in capacity from 25 up to several hundred gallons, depending again on the size of the plant. These vessels, generally made of glass-lined or stainless steel, are usually equipped with power driven mixers. The sirup may be filtered either before or after blending, or both. Of quite recent development are specially constructed pressure filters which are reported to effectively remove all microorganisms, thus sterilizing the sirup.

Sirup Room

In order to take advantage of gravity flow, the vessels in which sirups are prepared are generally located above the fillers. This means that the sirup room is often on the second floor or on a balcony within the bottling room proper.

Many successful plants are operated wholly on one floor level and the sirup is pumped from mixing tanks to fillers. Sirup level in the fillers is maintained by a float valve that operates a solenoid type switch automatically controlling the pump action and sirup flow.

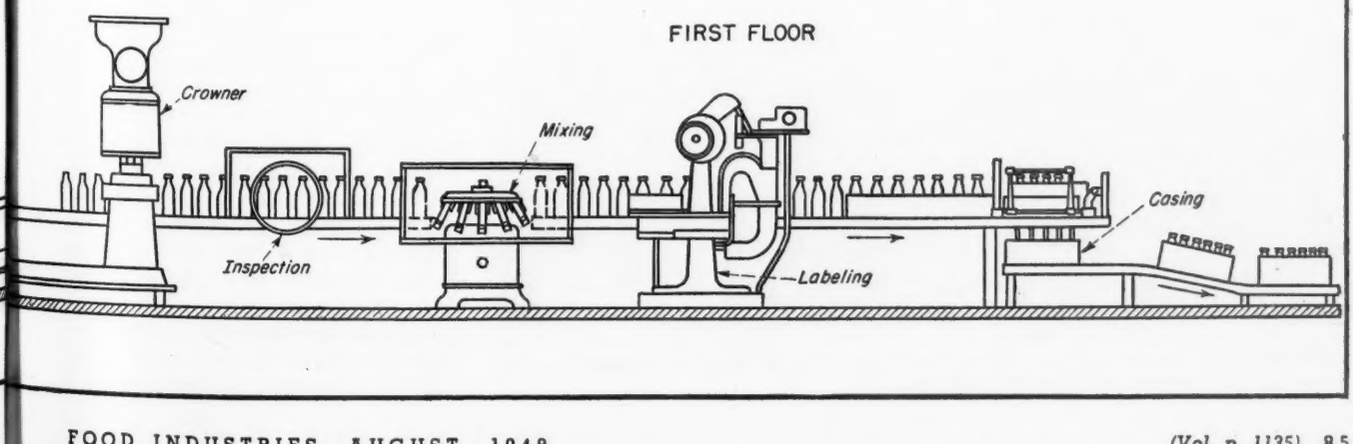
Since the sirup room is the heart of the bottling plant, cleanliness of equipment is absolutely essential. Strict sanitary precautions must be observed to prevent microorganisms, particularly yeasts, from gaining entrance to the sirup and thence being carried over into the finished product. Before and after each batch of sirup, it is, therefore, customary to wash all equipment thoroughly with hot water, following with sterilization.

Chlorine is the accepted germicide in the bottling plant. Because of conflictions in available information regarding quaternary ammonium compounds, the bottled carbonated beverage industry has been advised against the use of such compounds on any equipment, or on bottles with which beverages or their ingredients come in contact.

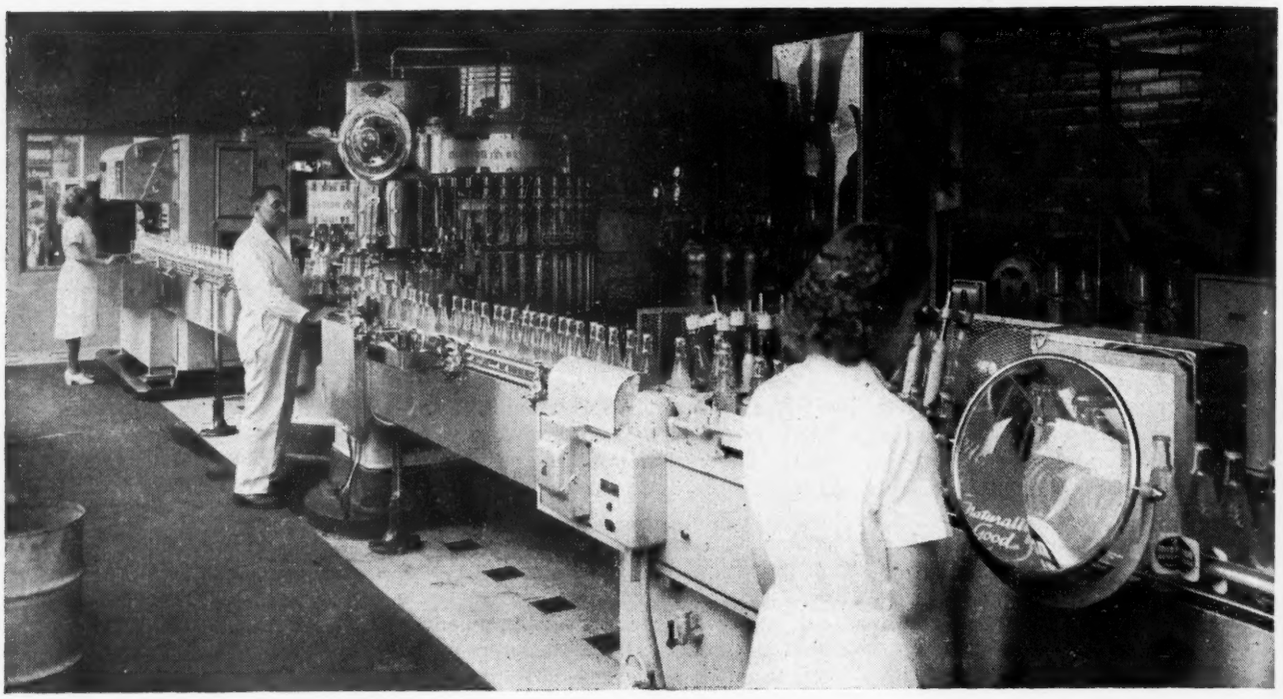
* As used in carbonated beverage industry, the term simple sirup means 26 to 32 Be. sirup. It is not to be confused with USP simple sirup containing 850 g. sugar per liter (approx. 36 deg. Be.).

Efficient Flow And High Speed Operation—

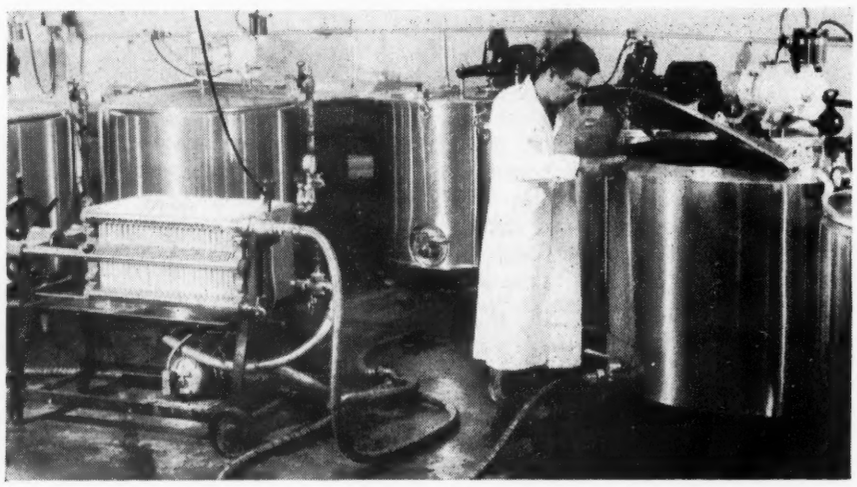
characterize the modern beverage plant. This flow diagram (left and below) shows a complete production line. Sirups are prepared on the balcony (left) and flow by gravity to the filler on the first floor. Water is treated to remove minerals, salts, taste and odor before it is cooled and saturated with CO_2 in the carbonator. Filled bottles are inspected, mixed, labeled and cased (below). Some plants are operated entirely on one floor. The sirups are pumped from mixing tanks to fillers.



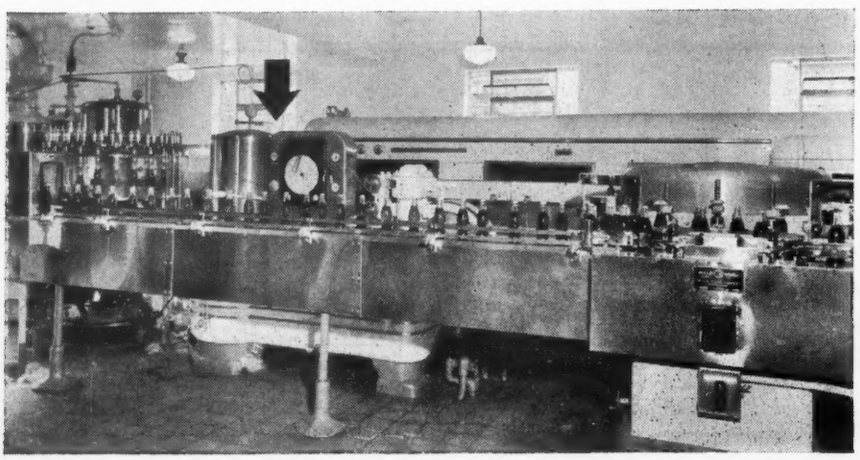
Sanitary Standards in the Soft Drink Field...



BOTTLING LINE in modern carbonated beverage plant showing empty bottle inspection (left), filling (center), and filled-bottle inspection with inspection magnifier (right). Carbonator and refrigeration unit are seen at right of filler.



FLAVORED SIRUPS are prepared from sugar, flavoring, certified food colors, edible acids. Sirups are pumped through filters into feed tanks that supply fillers.



CARBONATOR. (arrow) produces carbonated water for filler (left) by atomizing cooled water in an atmosphere of CO_2 under pressure.

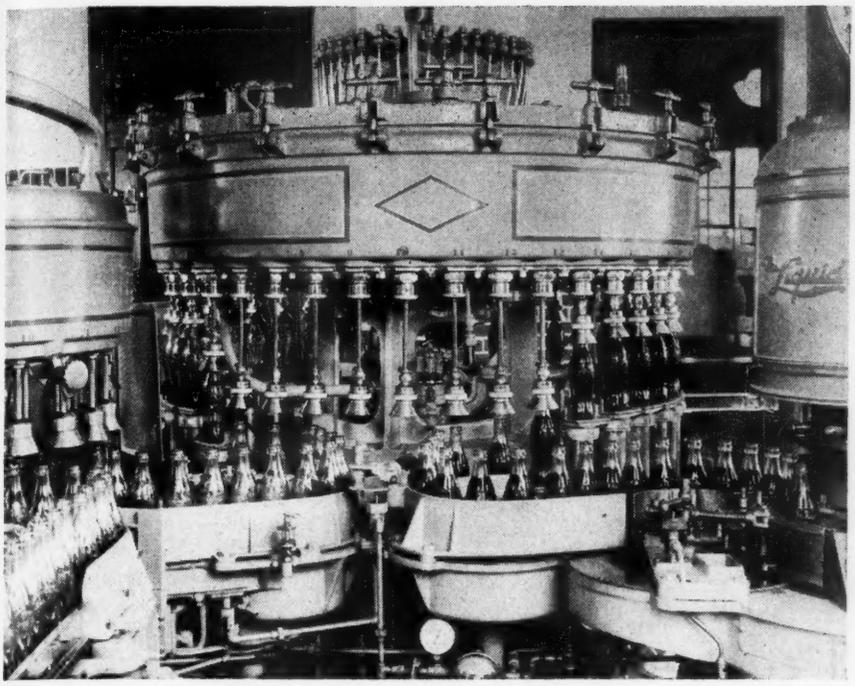
Water used in the manufacture of bottled soft drinks is always obtained from a supply which local or state health authorities have approved as a source of drinking water. But water approved for drinking is not always suitable for use in soft drinks, hence it is generally treated in such a manner as to improve the appearance, taste and odor, and to eliminate certain minerals and salts naturally present in waters in different localities.

Hard Water

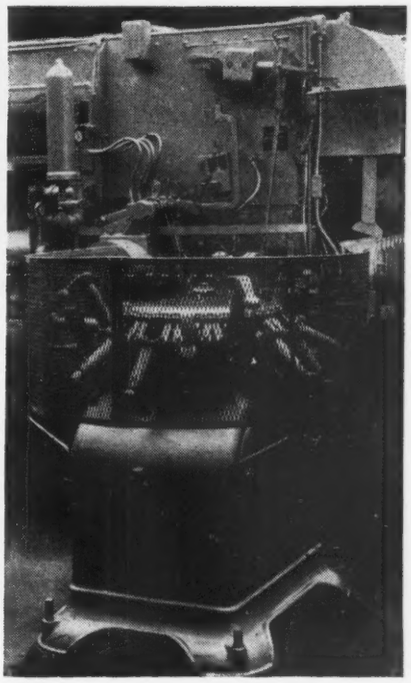
Alkalinity of over 100 ppm. is undesirable. When blended with acidified flavored sirups, such water would tend to neutralize some of the edible acid, giving the finished beverage an off-taste or non-uniform character. Presence of excess alkaline salts might also cause unsightly sediment formation in the beverage. Abnormal amounts of minerals, particularly iron, may produce the same effect.

There are several water-treatment processes in use. And that employed in one plant may not be satisfactory in another using different water. This is because the sanitary, physical and chemical characteristics of water vary in different sections. Waters obtained from rivers, lakes, springs or deep wells, even in the same geographical section, can vary in these respects, hence call for different methods of treatment.

Water treatment equipment may



FILLING. Siruper (left) adds measured volume of flavored sirup to each bottle. Filler proper (center) adds carbonated water. Crowner (right) seals bottles.



MIXING. Combined whirling and end-over-end motion mixes beverage.

consist of nothing more than a filter of sand or of sand and activated carbon. The latter is necessary for the removal of chlorine and other foreign tastes and odors. Tastes and odors, if present, are likely to affect adversely the delicate taste balance of the finished beverage. Frequent and thorough backwashing and sterilization of the filters are absolutely necessary for efficient plant operation. In addition, the filter beds must be replaced periodically with fresh sand and activated carbon. Frequency of replacement depends on the amounts of foreign substances to be removed and the volume of water filtered.

Special Treatment

At the other extreme are those plants with very elaborate and complete water treatment equipment. Units may be included for superchlorination, coagulation or sedimentation, followed by filtration, and occasionally ozonation, or ultraviolet radiation. Opinions differ as to the exact value of the latter treatment.

Some plants use the cation-anion exchange demineralization units, while others use one of the various zeolite systems. Distilled water is not generally considered necessary, but there are some plants in which it is used.

Third important component of bottled carbonated beverages is carbon dioxide, which furnishes their identifying characteristic. The amount of carbonation that is most desirable is a question of long standing, depending for its answer on the type or flavor of the beverage and the manner in which the drink is to be used. It is a generally accepted fact that suitable carbonation is most important because of the pungent acidic taste it gives to the beverage, plus the beneficial physiological effect it is believed to have on the digestive system.

Carbonation is the result of dissolving CO_2 in water, under conditions of favorable temperature and moderate pressure. The amount of CO_2 forced into the water is expressed in volumes. One volume is the amount of gas a given quantity of water will absorb at atmospheric pressure and a temperature of 60 deg. F. These two arbitrary points have been set by agreement, since there must be some starting point in any standard measuring system.

Since CO_2 can be liquefied or solidified under proper conditions of temperature and pressure, much of that used in the soft drink industry is delivered in those forms. In the early days of the industry, the gas was manufactured in the bottling plant, using marble dust and sulphuric acid. In these instances the gas was carried directly to the carbonating mechanism. For many years thereafter, all CO_2 was delivered in the liquid state in steel cylinders containing 50 lb. under a pressure of approximately 1,000 psi. In fact, much of that used in the industry today is delivered in this form.

Subsequently, solid CO_2 (often called dry ice) proved its worth and is now used extensively in the industry. The solid product must, of course, be placed in a sealed convertor (liquefier). The convertors are of various capacities, some holding 150 lb., others having a capacity of a ton or more. In these units the dry ice sublimes and liquefies, due to the outside heat reaching it. At a temperature of 70 deg. F., solid CO_2 will liquefy completely in 12 to 18 hr.

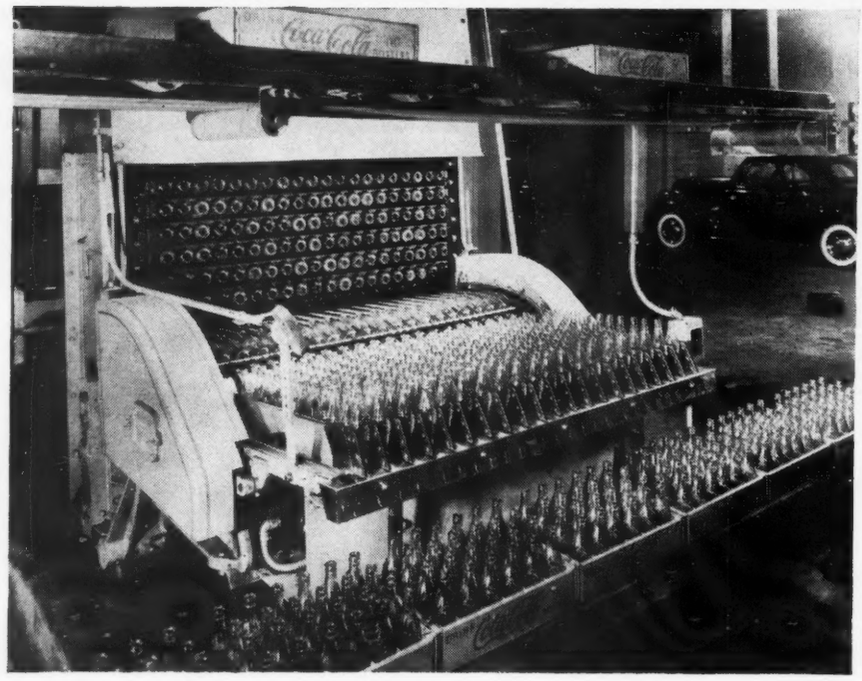
Now gaining in popularity is a new method of distributing CO_2 to soft drink manufacturers, employing the liquid low pressure product. It is delivered to the plant refrigerated and under a pressure of 300 to 325 psi.

Carbonators

Whatever the form in which CO_2 is received in the plant, the same procedure is used in making it available for carbonation. When the valve on the container is opened slightly, thus releasing the pressure, the CO_2 escapes in the gaseous state. To control this release of gas, a regulator is installed between the container and the carbonator. This permits escape to the carbonator of only the amount necessary to carbonate the water to the desired volume.

Carbonators — or saturators, as

Bottles Must be Clean and Sterile Before Re-Use



INFEED of two-story soaker washer. Rows of bottles are automatically inserted in pockets of carrier, which elevates them through ceiling and into washer on floor above.

CLEAN BOTTLES are discharged from front of washer unit and conveyed to the filler.

they are sometimes called—are of three types. In one type the incoming water is atomized by means of a spiral spray head. Another allows the incoming water to flow over a vertical series of pans. And in the third, the water flows over a corrugated evaporator (within the carbonator) which cools the water at the same time absorption of CO_2 is taking place.

In each case, the fundamental idea is to atomize the water to promote rapid and thorough absorption of the gas. The degree of absorption depends entirely on the efficiency of the water-atomizing means. Obviously, the greater the water surface exposed to the gas, the greater will be the rate of absorption.

The temperature of the water plays an important part in the solubility of the gas. The colder the water, the more gas it will absorb under a given pressure. Hence refrigerating equipment is required in most plants. Such equipment should be of sufficient capacity to cool the water to between 35 and 40 deg. F. before carbonation. After being carbonated, the water is carried to the filling machine, still under pressure in order that it may retain the gas when mixed with the sirup and bottled.

Bottle Washing

Since the bottles used for carbonated beverages are of the refillable type, they must be rendered scrupulously clean and be commercially sterile before re-use. In the bottle-washing operation, all empty bottles, whether new or used, are given a thorough cleansing and sterilizing in soaker type wholly automatic washers immediately before filling. The soakers are of two general kinds — hydro and brush — with several different sizes and styles in each category.

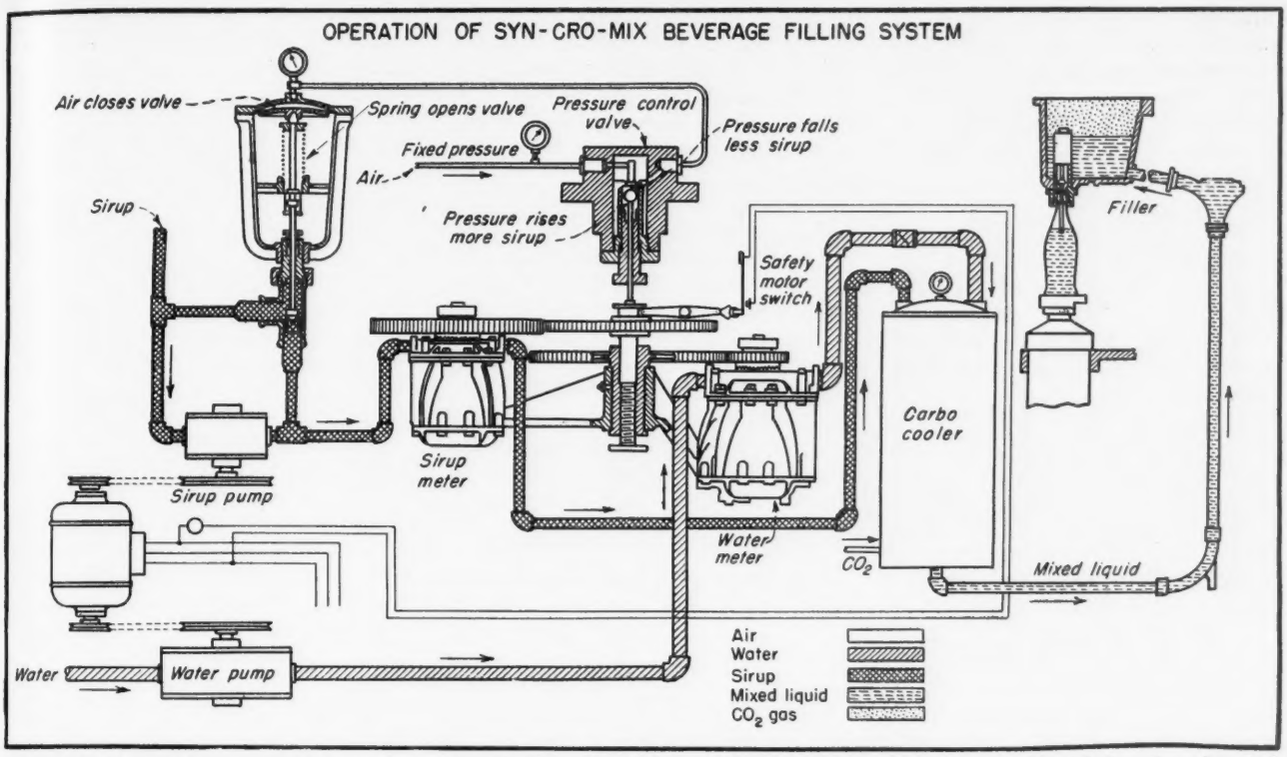
Hydro washers are those in which there is long, dormant soaking of the bottles in hot, strong caustic solution, followed by powerful pressure sprays of a similar solution. Such treatment removes all dirt and foreign matter. There follow fresh water rinsings of both the inside and outside. Potable water is used for the final rinsing.

In brush type washers, the long, dormant soaking is followed by inside and outside brushing of the bottles with strong, stiff bristle or nylon brushes, followed in turn by rinsing with potable water.

Washers vary in size and bottle-washing capacity — from the one-compartment, single-end "baby" size, capable of turning out about 25 6-oz. bottles a minute, to the multiple-compartment, double-end, 24-bottles-wide mammoth size washer. The latter machine will satisfactorily wash and sterilize 280 to 320 6-oz. bottles a minute.

In the development of the soaker method of bottle washing, attention was paid to the sterilizing action of the various chemical compounds used. It was found that, of the many compounds studied, only caustic soda had sufficient germicidal activity, when used alone, to destroy effectively all undesirable microorganisms in the bottles.

It was learned, however, that the addition of certain amounts of milder alkalis — such as sodium carbonate, trisodium phosphate or the silicates — materially increased the germicidal efficiency of the caustic. For instance, if 1.2 percent sodium carbonate (calculated as sodium



IN PRE-MIX METHOD, sirup and water are automatically metered into carbonator, where they are mixed, cooled and carbonated. Then mixture is fed to filler. This system eliminates siruping and mixing in the bottle. (Courtesy Geo. J. Meyer Mfg. Co.)

hydroxide) is added to 1.8 percent sodium hydroxide solution, the germicidal efficiency of the resulting mixture would be the same as if there were present 2.16 percent of sodium hydroxide alone.

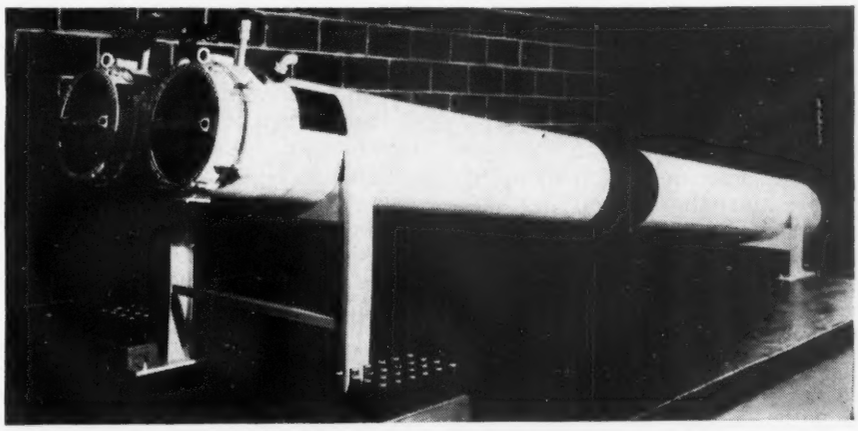
Consequently, the bottle washing solutions customarily used have a total alkali content of at least 3 percent, with at least 1.8 percent caustic. This concentration is maintained at all times by frequent tests.

It is also recognized that the temperature of the solution and time of soaking have a decided effect on the sterilizing efficiency. The most widely recognized standard for complete and thorough cleansing and sterilizing is that recommended by the ABCB. This standard is as follows:

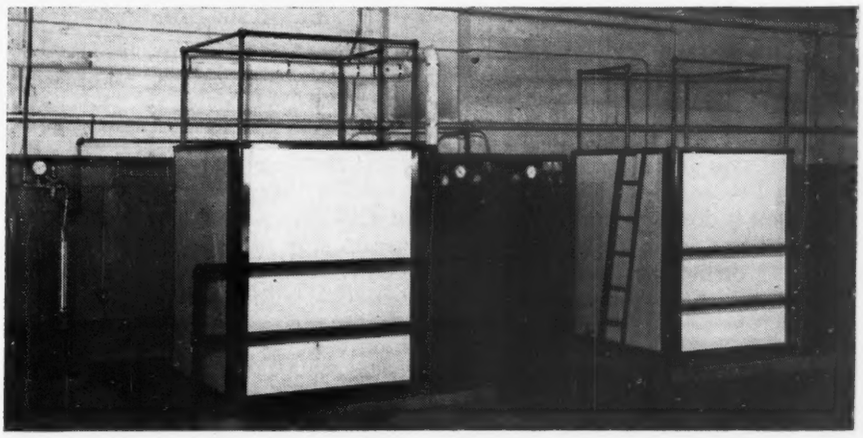
> **"Unclean bottles shall be exposed to a 3 percent alkali solution of which not less than 60 percent is caustic (sodium hydroxide) for a period of not less than 5 min. at a temperature of not less than 130 deg. F., or to an equivalent cleansing and sterilizing process."**

Regulations governing type and strength of bottle-washing solutions promulgated by many states are based on this standard.

In bottle washing, it is important that all bottles be carefully inspected before entering the machine and again after washing. No cracked



CONVERTERS change dry ice to liquid CO_2 then into gas for use in carbonators. Each converter has a capacity of 1,000 lb. of dry ice. (Courtesy Pure Carbonic Inc.)



LOW PRESSURE liquid CO_2 is delivered to these receivers in specially designed trucks. It is held at a low temperature until used. (Courtesy Pure Carbonic, Inc.)

bottles should be permitted to enter the washer. Bottles of questionable cleanliness and those cracked or otherwise defective are removed by an inspector stationed at the discharge end. From this point, the clean bottles are automatically carried by traveling chain conveyor to the filling machine.

Filling and Crowning

Final steps in the manufacturing process are filling, crowning and labeling — the latter step being omitted when the bottles have permanent labels, that is, permanently impressed or applied color labels. There appears to be a definite trend toward increased use of ACL (applied-color label) bottles.

Two filling-and-crowning methods are in use. The one most commonly used is a three-stage process. A measured amount of the flavored and acidified sirup is discharged into each freshly washed bottle as it passes through the filling unit's siruper. The bottles are then conveyed to the second part of the unit, where the carbonated water is added. In order that the stability of the carbonated water may be maintained, the filler is so constructed that a constant counter pressure is maintained during the filling cycle. In the third stage, the cork-lined metal crowns are automatically pressed onto the bottles, thus hermetically sealing them.

In the other method of filling, the proper amounts of sirup and water for each bottle are automatically measured by a continuous metering system, mixed, cooled and carbonated simultaneously by forcing through a special type of carbonator. From the carbonator, the mixture is piped directly to the filler and fed into the bottles. This method, generally called the "pre-mix" system, is of fairly recent origin and is not as extensively used as the first. It is an important new development.

In the aforementioned three-stage method, the filled and capped bottles generally move on to the mixer. Here, the contents are thoroughly mixed by a combined whirling and end-over-end motion. In plants not equipped with automatic mixers, the operation is done by hand as the bottles are lifted from the accumulating table for casing. In the pre-mix system of filling, mixing of the filled bottles is not required.

Synchronized Operations

Speeds of washing, filling, crowning, labeling and mixing machines are synchronized to provide a steady flow of bottles along the line. Uninterrupted operation is essential to economical production. A washing machine with a rated capacity of 200 to 300 bottles per minute must be followed by other units of like capacities to avoid stoppage of any unit because of the slower action of another piece of equipment in the production line.

The whole process of carbonated beverage manufacture is particularly efficient because of this continuous automatic operation of high speed machinery. The filling operation is of especial interest because of the great precision required. As previously stated, some of the larger machines have a capacity of over 200 6-oz. bottles per minute, with an extremely low incidence of error in proper filling.

Inspection of Filled Bottles

Of extreme importance are inspection of filled bottles before casing, and conveying of filled cases to storage areas. Inspection is done with the aid of strong light, often through a magnifying glass especially made for the purpose. This unit is permanently attached to the conveyor line in front of the inspector. Purposes of the final inspection are to pick out any bottles which may have been cracked in the filling and crowning operation, and to detect and remove those containing any chance foreign particles. In addition, such inspection often detects improperly filled bottles.

Electronic methods are already finding some uses in various food industries. It is entirely within the realm of possibility that in the not too distant future, experimental work in that field, now reported under way, will produce automatic inspection devices which will not only pick out defective bottles and detect the presence of foreign matter in them, but will also check the accuracy of the compounding process.

Materials Handling

An important part in the efficient operation of a bottling plant is its materials handling. If a plant is producing a large number of flavors or sizes, then pallets, jack lift or hand trucks will permit the arrangement of filled cases in the storage area in such a way as to accommodate any combination of amounts, sizes and demands with considerable flexibility. On the other hand, many movable types of roller conveyors now in use have given satisfaction in bottling plants producing several flavors or sizes. Fixed roller conveyor systems are advisable if the plant produces but one product.

In using platform or lift trucks, there is the question of double manual handling of cases which, if very extensive, soon proves to be inefficient. A portable roller conveyor system can be made very flexible by extending it continuously from the unloading platform, or empty bottle storage area, past the feed end of the soaker and on to the accumulating table. Here the empty cases may be filled with the finished product and continued along the same conveyor system to the loading platform, or to any one of several storage spaces for finished goods.

Cleanliness Paramount

The modern carbonated beverage bottling plant reflects cleanliness and invites consumption of these products manufactured under strict sanitary conditions. It is notable that bottled carbonated beverages have never been found to be the cause of any outbreak of food-borne epidemic diseases in this country.

This should not, however, lead to the supposition that an unclean and insanitary plant — and unfortunately a plant of this type is occasionally found — can produce beverages which are in all respects equal to those produced in plants where strict sanitary measures are employed. Neither should the impression be gathered that no spoiled beverages ever come from a plant of the latter type. However, spoilage of a beverage is never caused by disease-producing microorganisms; air-borne bacteria, yeasts and molds, particularly yeasts, are the most frequent causes of spoilage, and chemical and physical changes are also sometimes responsible.

Good Housekeeping

Much is accomplished in the way of sanitary control by application of good housekeeping procedures — thorough and frequent cleaning and sterilizing of all equipment used, careful attention to bottle washing methods, collection and removal of all refuse in suitable containers, daily washing of floors, and elimination of flies, other insect pests and rodents. All of these measures are indispensable in maintaining sanitary conditions in the plant. They will aid materially in the production of high quality beverages.

The sanitary code developed by the ABCB has served as the basis for sanitary regulations in many states and municipalities, and it has proved so worthy that other food industries have considered its provisions in working out their own sanitary procedures.

INTRICATE porous structure of char granules is revealed by photomicrograph (40x). Note resemblance to large bone fragments. Purifying effect of char depends on extensive adsorptive area it presents—fully two square files to each one hundred pounds.

Bone Char

Behavior Is a Key to Sugar Refining Improvement

More efficient revivification of this adsorbent is one goal, as sugar industry and Bureau of Standards push long-range cooperative efforts to improve technics

BETTER understanding of bone char properties and basic behavior as related to structure is resulting from a program of research begun in 1939 at the National Bureau of Standards for fundamental study of sugar refining problems. Research shows that exhaustion of char with repeated use is accompanied by reduction of adsorptive surface area of the granules.

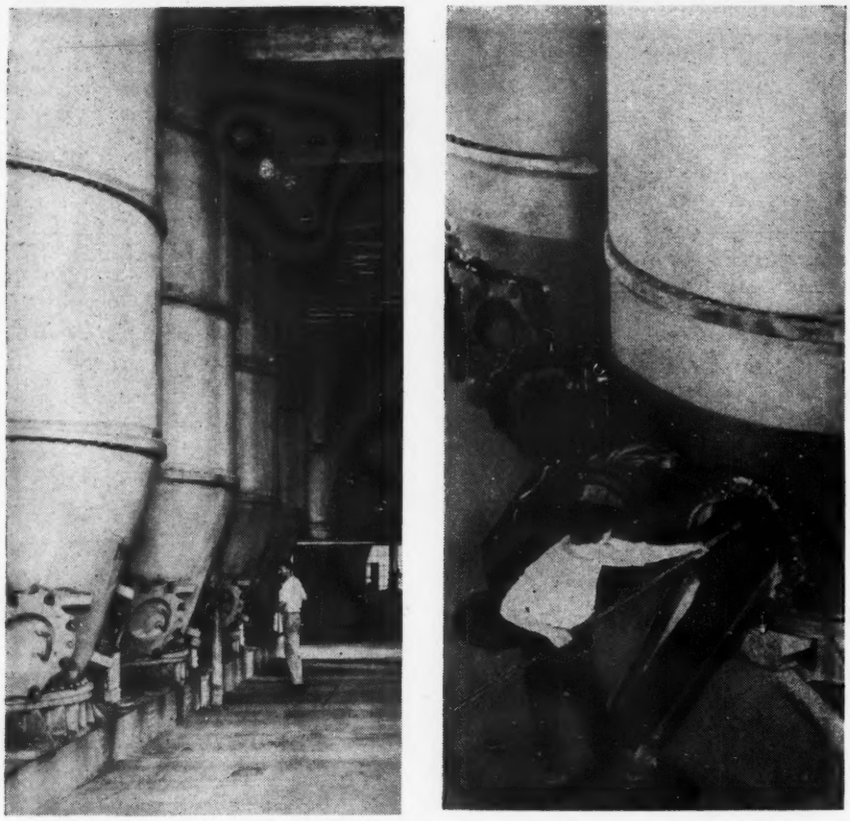
For over 50 yr. refineries have employed large scale regeneration processes involving washing, drying and heating of the char. However, improvements in these methods have not kept pace with modern trends in industrial operations. Studies now in progress are aimed at bettering the present revivification procedures.

Current practice of regeneration of bone char in sugar refineries requires numerous steps. After it has been used once for decolorizing the raw sugar and removing the impurities, the char must be water-washed in the filter. It is next removed through the trap-door in the base of the filter, (photo, page 92), then dropped through a trap to the floor below, where it is dried by heating. It then descends to the kiln floor to be further heat-treated for a specified time at a definite temperature. Finally, this renewed char is transported up three floors where, from above, it is dropped back into the filters for re-use.

From what has been learned so far in the program, it is possible to understand effects of excessive heat treatments in decreasing adsorptive properties of char. In the original bone, the crystal unit is extremely small. However, crystal size increases with heating, and the higher the temperature of heating the more rapid is the rate of crystal growth. Salts, insoluble in wash water, gradually accumulate in the structure of the crystals and increase their size. Subsequent heating develops more elaborate crystalline aggregates.

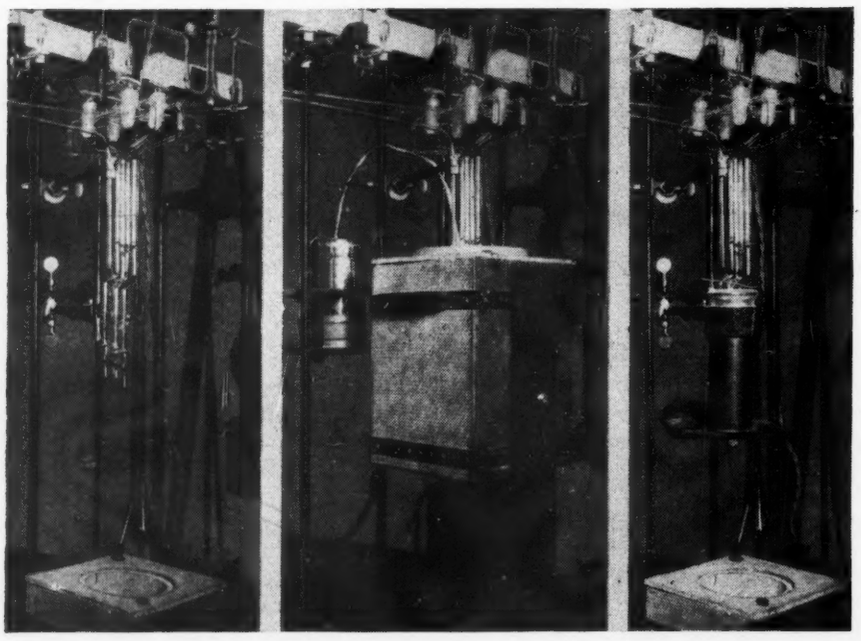
With corresponding reduction in porosity of the granules, the available adsorptive surface decreases. Therefore, extreme temperatures in

Revivification Treatment Is Target



Char Regeneration Is Tedious, Slows Output . . .

In each large filter (left photo), raw sugar liquor passes through 40 to 45 tons of bone char for decolorization and removal of impurities. After each use, however, char must be removed (right) for several laborious—and delaying—regeneration treatments, since its adsorbent qualities decrease during filtration process. (Photos courtesy California & Hawaiian Sugar Refining Corp., San Francisco)



. . . Hence Data Are Sought To Improve Method

Apparatus devised by Bureau of Standards makes simultaneous determination of surface areas of four samples of commercial solid adsorbents, on basis of adsorption of gases. Left photo: Glass bulbs are filled with samples, then sealed off. Center: Residual adsorbed gases are removed from samples by heating in a furnace under high vacuum. Right: Bulbs are then cooled and a known quantity of gas (such as nitrogen) is admitted through capillaries. Now adsorptive surface area available may be computed from measurement of pressure and volume of gas before and after admission.

regeneration must be avoided if desirable porosity of bone char is to be retained. In present conventional kiln treatment, only the outside shell of char in the retort may be exposed to a dangerously high temperature, but in repeated passages through the kiln there is great probability of exposure of most of the char.

Density Increase

One of the outstanding characteristic changes found after repeated use of bone char is its increase in bulk density. New char averages only about 40 lb. per cu. ft., but spent char may attain twice that density. Investigations made in early days of the program showed that increase in bulk with service was not matched by appreciable increase in true density, as determined from displacement of a known volume of helium by char.

Thus, demonstration showed that shrinkage of bone char did not occur, but porous structure within each particle filled up, increasing the weight per unit of bulk volume and decreasing available surface for adsorption.

Some success has been achieved in relating the density of bone char to its ultimate structure. Accumulated data indicate a rough proportionality between bulk density and several adsorptive properties. This relationship may form the basis of a practical method of testing chars and will, it is believed, provide a rational criterion upon which service char may be safely discarded.

Char Structure

One primary objective in this research has been attainment of an understanding of fundamental bone char structure. This knowledge is essential to a study of reactions which determine over-all efficiency of the revivification step. Complete information on the structure of revivified char delivered to filter and that of exhausted char after filtration will make it possible to specify what the regeneration process should accomplish and to suggest logical steps for improvement.

Structure of bone char has been investigated by means of X-ray diffraction spectra; electron micrographs; density determination; measurements of surface available to known gases; chemical analysis; and studies of specific heats, heats of wetting and heats of combustion. Research has disclosed that primary structure of char consists of microscopic crystals of a complex hydroxyapatite crystal lattice. Superimposed

on this is secondary macrostructure derived from original cellular composition of bone. Tiny units of the hydroxy-apatite crystals have been slowly deposited in an intricate arrangement during growth. Bone matrix, blood capillaries and associated bone-forming cells are also intimately inter-connected to produce a very porous structure on charring.

Adsorptive Properties

In general, adsorbing properties of solid adsorbents depend first upon variations in extent of available surface and secondly upon effects due to specific chemical reactivity of the surface. Using a method based on the adsorption of nitrogen gas at temperature of boiling nitrogen (77 deg. K) or of boiling oxygen (90 deg. K), it was shown that new bone char has a surface area of about 130 sq. m. per gram or 2¼ sq. mi. per hundred lb. Spent chars were then shown to have smaller surface area which decreased as the ability of chars to decolorize raw sugar solution diminished.

Specific chemical activity at the surface may take the form of reversible or irreversible chemisorption, a catalytic surface oxidation, or an ionic exchange. A catalytic surface oxidation may immediately follow physical adsorption, yielding products which in some cases may be even more tenaciously held.

Evaluation of specific chemical reactivity has been a difficult task. The most promising methods of attack in the case of carbon adsorbents are based on studies of reaction of the adsorbent with oxygen and decolorizing reactions in raw sugar liquors at various temperatures.

Need for Research

Prior to 1939, detailed basic knowledge of bone char process in sugar refining was very meager. It became increasingly evident that scientific information regarding fundamental nature of commercial solid adsorbents was necessary for further improvement in sugar refining technology. Frederick J. Bates of the National Bureau of Standards initiated the research program, and it is now under direction of Dr. Victor R. Dietz of the Bureau's surface chemistry laboratory. Interest in the project has grown so that today industrial supporters of the work include almost all cane sugar refineries and bone char manufacturers of U. S., Canada, England, Australia and South Africa.

To establish a basis for extensive research, a comprehensive survey of scientific literature on adsorbents and adsorption, begun at the Bureau in 1939, resulted in 1944 publication of a 958-page volume entitled Bibliography of Solid Adsorbents. The information covers the years 1900 to 1942 and has been kept on a current basis. A supplementary volume listing literature for the period 1943 to 1950 is planned.

Industry Cooperation

Commercial facilties for handling large quantities of sugar liquors and bone char make possible plant-scale experiments which supplement laboratory work and permit evaluation of practical application of fundamental research. Projects which cannot be conveniently undertaken by any one of cooperating sponsors are still conducted in Bureau laboratories. However, problems requiring plant facilities for their solution are now studied in a number of individual refineries.

New Ion Exchange Resins

Additions to Amberlite Family Permit Expansion of Ion Exchange Applications

RECOVERY of amino acids from packing house wastes, milk by-products and industrial wastes is one of the proposed uses for new synthetic ion exchange resins recently introduced by The Resinous Products & Chemical Co.

Other applications include: (1) One-step removal of silica from boiler feed water; (2) mixed-bed exchange for deionizing solutions at a neutral pH; and (3) reverse deionization.

Development of these resins makes possible the removal of negatively or positively charged ions from clear solutions over the pH range from 1 to 14. (see accompanying bar diagram). Characteristics of the new resins are given in the table.

Four New Resins

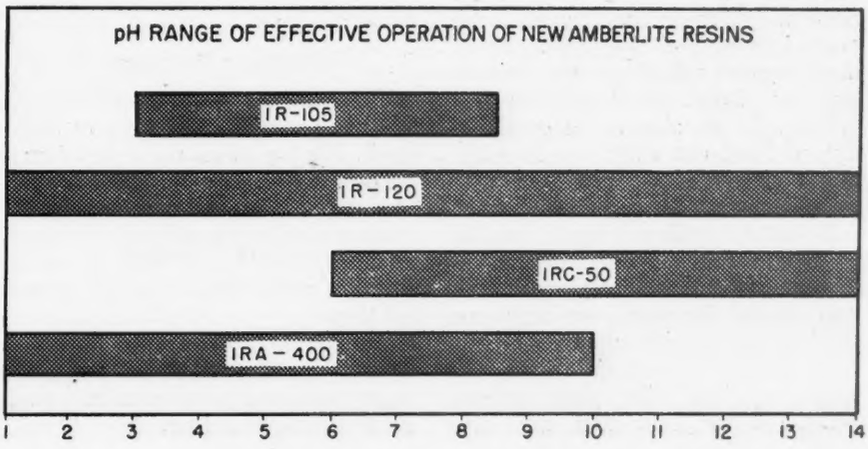
The strongly basic resin Amberlite IRA-400 behaves as solid caustic with only its hydroxyl ions in solution. It will adsorb negatively charged ions from acid, neutral and mildly alkaline solutions. Until its development, mixed-bed and reverse ionization were not possible.

Materials sensitive to fluctuations in pH, such as milk, sugar, protein hydrolysates and blood, may be readily processed by the mixed-bed exchange. This one-step, one-container method employs an intimate mixture of two resins — Amberlite IRA-400, the strongly basic anion resin, and a sulphonic acid cation exchanger such as

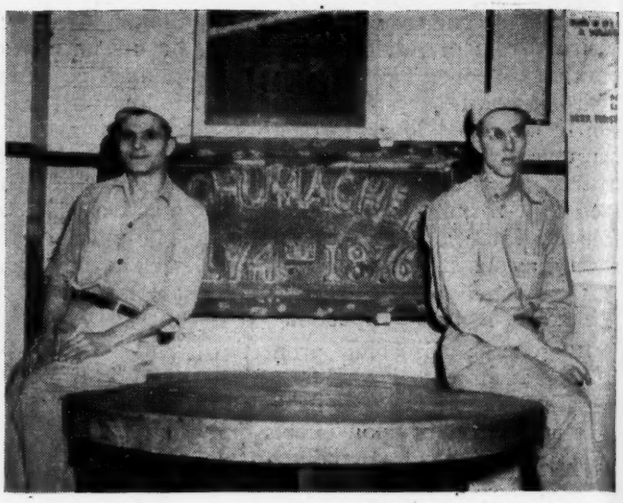
(*Continued on page* 200)

CHARACTERISTICS OF NEW ION EXCHANGE RESINS

	AMBERLITE GRADE			
	IR-105	**IRC-50**	**IR-120**	**IRA-400**
Type exchanger	Cation	Cation	Cation	Anion
Active groups	Sulphonic	Carboxylic	Sulphonic	Modified amine
Behavior	Strongly acid	Weakly acid	Strongly acid	Strongly basic
Form	Bead	White bead	Bead	Granular



JOB TRAINING extends to every department. The training director is here reviewing the first day's work of five new shipping room men.



TRADITIONS are fostered by such reminders as these two cornerstones of early units and the smooth-worn millstone used as a table.

Quaker Oats Finds Ways

This breakfast cereal manufacturer finds that where the same products must be

By W. M. McILWAIN, Personnel Manager, Akron Plants, The Quaker Oats Co.
(Photos by Fred B. Barton)

OUR job at Quaker Oats is to make the best breakfast foods we know how, and to do the job dependably well. We have, therefore, paid a lot of attention to finding, training and keeping skilled, interested and loyal employees.

The Quaker Oats Co. has 12 U. S. plants and 8 personnel managers, all reporting to headquarters for the Chicago area. The idea is to find out whether employees want such things as an annual company picnic (they do) and a bonus paid in a lump sum instead of dribbled out to them week by week (they prefer the lump sum) and bowling teams and Old Timers' Banquets (they like that, too). Sometimes these employees have new ideas of their own. So one of the things we tell all our supervisory staff is: "Don't spend all your time talking. Learn also to be good listeners. Find out what people want, and then see if we can give it to them."

When an applicant for a job has been interviewed, given a physical examination by the company doctor, and cleared for work, we don't just tell him to give his name to the doorman and go to work. We bring the employee into the plant offices, punch in the time-card, and give some preliminary talks on company time.

Our training director gives a brief history of the company and tries to make the employee eager and interested. The safety director gives a brief talk at his desk. Then we show the employee the location of the men's (or women's) locker-room, issue a key for an individual locker, stop at the men's or women's lunchroom for a free cup of coffee, and introduce the newcomer to some of the people in the department where he or she is to work. All this takes a couple of hours; maybe more. When we check the party out at the time clock he or she is no longer a stranger.

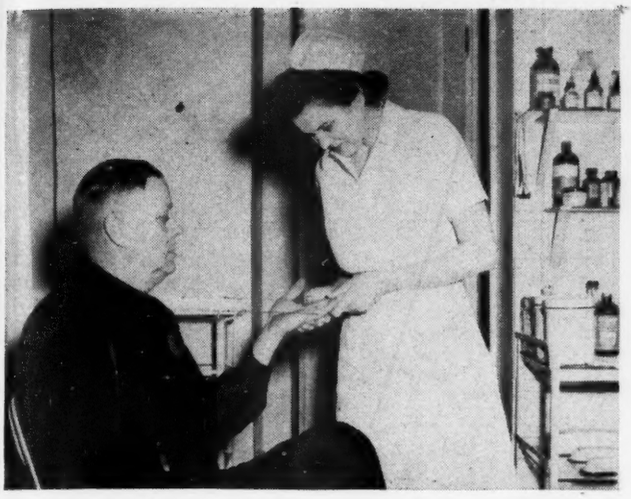
Training Program

These things make a difference. We like people to be happy in their work. We try to supply a few hints on how to make good, how to get acquainted with fellow employees, what to do if any employee has questions to ask or suggestions to make. The Welcome Mat is always out, we tell them.

The training program includes industrial movies, taken in our own plant with our own cameras, and group discussions from time to time. For instance, the camera caught a group of half a dozen lads who had started work that day loading flour and feed into freight-cars. After their first day on the job the plant training director brought them together for a brief chat. A miniature freight-car with doll-sized sacks is there to demonstrate safe and uniform loading. If we have noted any discrepencies, any carelessness, we explain the importance of loading a car according to our tested system. If a loader shows up with blisters or a tired back, maybe he isn't doing his lifting properly. We invite suggestions and make our own suggestions in return.

Starting 18 months ago we organized a training program for supervisory help. As rapidly as possible we are carrying this through all our departments, showing hourly workers how to get more out of the job; showing old-timers a few new kinks, trying to bring everybody up to a comfortable efficiency in a painless, friendly way.

For the company's part there are not very many rules that have to be enforced, and what rules there are have a sensible basis. One "Thou Shalt Not" deals with tobacco. Its use is forbidden in any form: smoke, chew or snuff. An explosion or fire in a cereal mill can be deadly and destructive, and every thinking person knows it. The unions agree with us. Any employee caught smoking in the



EMPLOYEE PROTECTION includes a company dispensary, where a trained nurse administers first aid and the usual preventives.

TOBACCO BAN is prominently placarded at time clock. Author (seen here) says the "positively" deters most quibblers.

To Keep Its Workers Happy

turned out daily, employee training and morale pay-off in top quality output

wrong places gets fired, and stays fired. There never is any first or second warning.

Plug tobacco, if dropped into a food container, might represent "foreign matter" and involve the firm in unpleasant publicity and a costly lawsuit.

But the men can smoke in the men's lunchroom, and the girls are free to smoke in the girls' lunchroom. During conferences in the plant offices they may smoke, too.

Another rule (for girls) is: No jewelry, no wrist-watches, no rings with stones in them, no necklaces, no earrings.

George C. Fretz, the plant superintendent, sometimes explains this in an informal, easy way. "Suppose one of you girls drops an earring into a package of rolled oats and a customer finds it, always assuming he or she doesn't break a tooth on it, first. Maybe the party comes back at us and says, 'I only got one earring. Where's the other one?' "

Finger-rings and necklaces might get caught in belts and machinery. Banning anything that can drop into the product or cause the girl to get caught in a machine is a safety matter. Employees understand that.

But to humanize the ruling against no jewelry the company does its best to keep our girl employees attractive and individual. We issue natty uniforms, made up in gay colors. Further, many of the girls wear bright kerchiefs—purple, canary yellow, grass green—in a breast pocket, in a competition to be distinctive. This good-natured activity suits everybody.

Keeping the girl employees happy calls for a few thoughtful touches such as a large wall mirror in the girls' restroom. Nobody has to wonder how she looks on the job—she knows she is presentable.

We maintain no plant cafeteria, but we have two lunchrooms, one for men and one for women. Everybody brings his own lunch, or goes out for it. You can buy such things as nickel candy-bars as desired. One thing we furnish—free coffee, but you provide your own sugar. The idea is to discourage anyone from bringing coffee in glass bottles, with the attendant risk of breakage. Milk in paper containers is available too, on a subsidized basis: a nickel a pint. Management pays the difference.

The ladies' lunchroom has a piano, which is used on such occasions as Christmas parties. Also there's an electric refrigerator and a gas stove. If a girl wants to heat up a can of soup, she is welcome to do it.

Central Location

The city of Akron has grown up around our plants, so that today we pay heavy city taxes on manufacturing property. Our cereal and packaging departments especially occupy space that would almost serve for department store purposes, or offices, or apartments. One advantage of having a plant located downtown of course is that bus-lines radiate out from the center of the city, so that employees have various ways of getting to work.

Free Parking Space

Despite high rents, the company maintains free parking space for all employees. And because of the downtown location we probably get a higher than average type of employee. When our employees quit work they don't look like dusty workers in a flour mill. They can take a shower and dress in street clothes and look as if they worked in an office. They go from here to the downtown stores and do their shopping. This of course is an intangible something and impossible to evaluate, but anytime our firm worries about its high city taxes and considers moving, the advantages of a downtown location in keeping personnel happy are a real argument against moving the plant to an outlying location.

Most of our working talent is along normal production lines, but we try to keep an eye open for unusual skills. Thus we discovered that a feed mill employee of ours, a former GI, has ability as an artist and cartoonist. We are paying him to do a series of safety posters in color

(*Continued on page* 192)

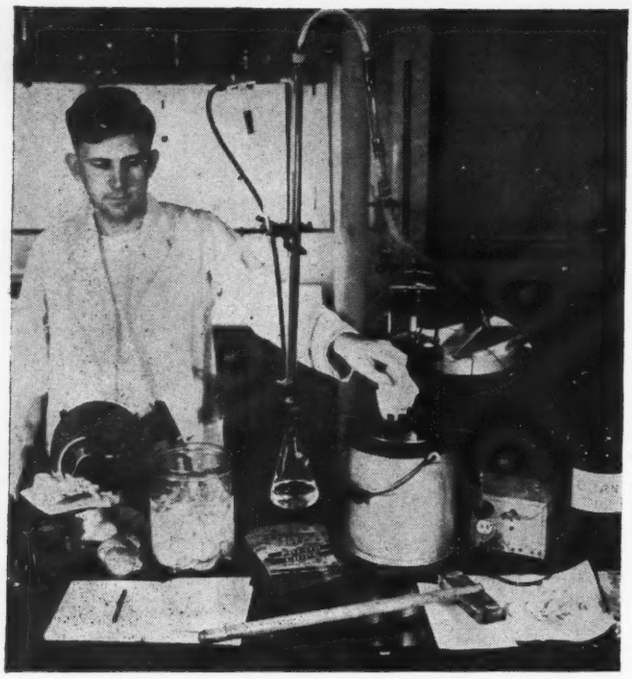


FIG. 1. FRYING KETTLE consisted of electrically heated stainless steel beaker, with mechanical stirrer and thermostatic control.

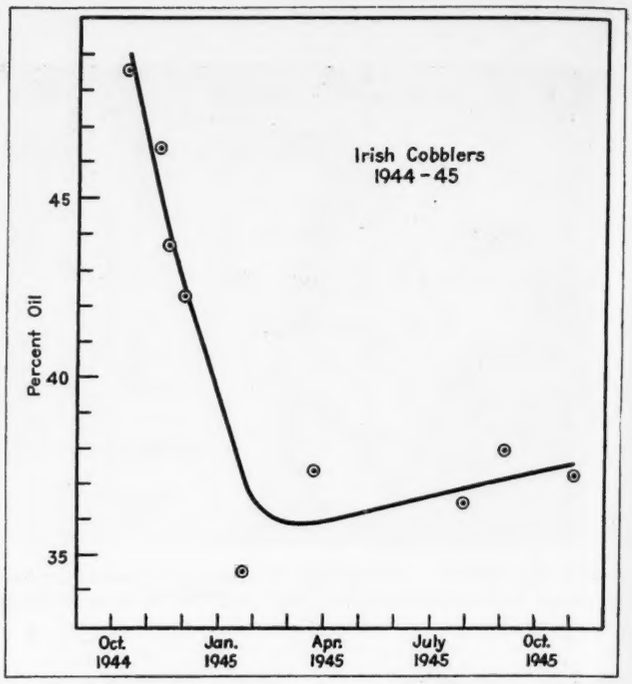


FIG. 2. SEASONAL VARIATION in oil content of potato chips made from Irish Cobbler potatoes and tested through 1944-45.

Factors Influencing Oil Content of Potato Chips*

Freshly harvested potatoes produce chips of high oil content. Treatment with hot water before frying lightens color but increases oil uptake. Pretreatment with sodium chloride solution greatly reduces oil uptake

By R. E. STUTZ and R. H. BURRIS, Department of Biochemistry College of Agriculture, University of Wisconsin, Madison, Wis.

TREATMENT of potato chips with hot sodium chloride solution before frying greatly reduces the oil uptake as compared with hot water treatment. It is less effective, however, than hot water for removal of materials responsible for dark colored chips, and should not be depended upon entirely to remove sugar from tubers stored at low temperatures.

Factors influencing the color of potato chips have been studied,[1,2,3,4,5] but the control of oil uptake has been largely neglected. Recently, however, a study has been completed on the influence of variety, maturity and storage history of tubers, and the effect of various treatments of raw chips upon the oil uptake during frying.

The oil uptake was determined at approximately monthly intervals over a period of two years. Percentage of ash and water was determined on the chips and Kjeldahl nitrogen on the ground, ether-extracted chips. Raw tuber tissue was analyzed for water and total nitrogen and ash after drying. The centrifuged sap from the tissue was assayed for total and trichloroacetic acid soluble nitrogen, total and reducing sugar, pH, ammonia and amide nitrogen. Oil content of the chips was determined by both weight loss and oil recovery on ether extraction.

Samples of potatoes were stored at 44.6 deg. F. They were moved to approximately 77 deg. F. storage not less than 14 days prior to frying. Approximately 10 lb. samples were peeled in abrasive peelers and labelled by removing a 25 mm. diameter plug transversely. Plugs were kept for analysis, and the marked tubers were sliced, washed and fried in a Ferry (Model A) continuous potato chip machine. The fried chips were removed from the top of the drainage belts before passing under the salter; they could be identified among the commercial chips by the holes resulting from plugging. Temperature of frying was 374 to 410 deg. F., and corn oil was normally used. Samples of chips were placed

* Published with the approval of the Director of the Wisconsin Agricultural Experiment Station. This work was supported in part by a grant from Red Dot Foods, Inc.

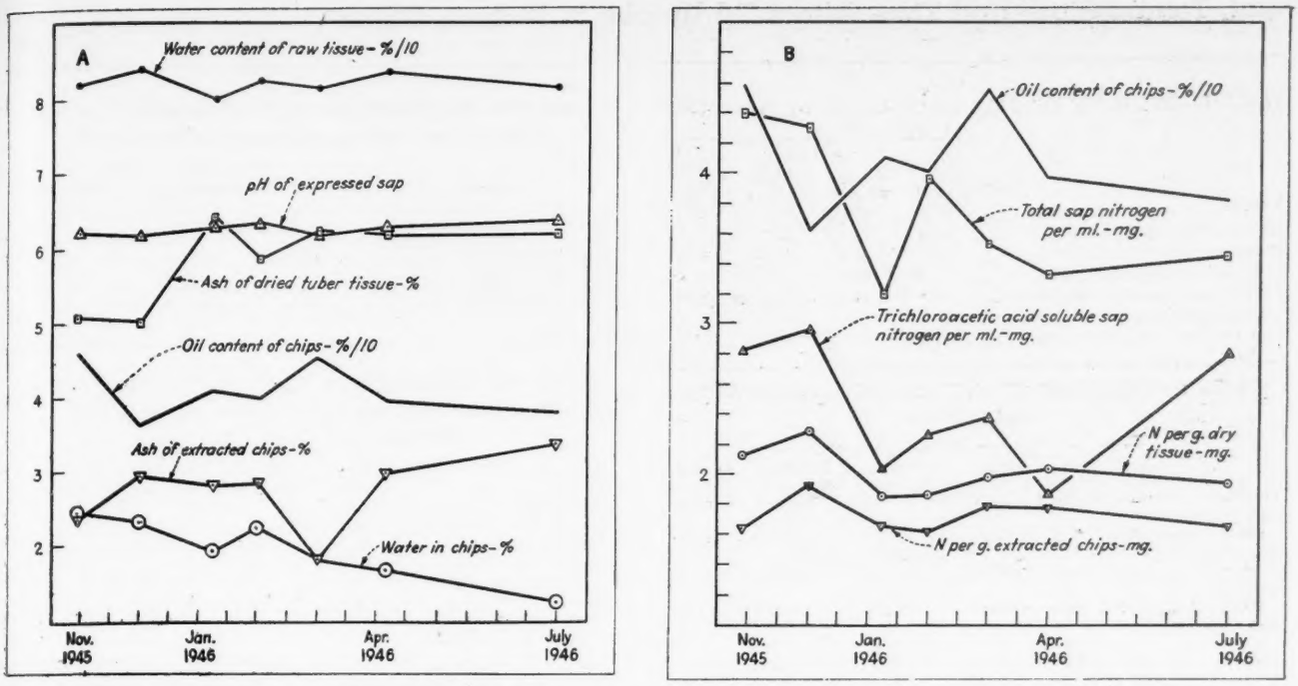

A
Water content of raw tissue - %/10
pH of expressed sap
Ash of dried tuber tissue - %
Oil content of chips - %/10
Ash of extracted chips - %
Water in chips - %
Nov. 1945
Jan. 1946
Apr. 1946
July 1946
B
Oil content of chips - %/10
Total sap nitrogen per ml. - mg.
Trichloroacetic acid soluble sap nitrogen per ml. - mg.
N per g. dry tissue - mg.
N per g. extracted chips - mg.
Nov. 1945
Jan. 1946
Apr. 1946
July 1946

FIG. 3. COMPOSITION of Irish Cobbler potatoes and chips produced from them during 1945-46 season. Water content of tubers and pH of sap were fairly constant. Water content of chips decreased steadily. Ash in chips showed a negative correlation with oil content.

in glassine bags and stored in a closed metal container until analyzed.

Since some difficulty was encountered in maintaining uniform oil temperatures and frying times in commercial machines, a small laboratory frying kettle, Fig. 1, was used in later experiments. Approximately 70 g. of raw or pretreated chips were placed in a stainless steel basket, the lid secured and the whole immersed in the 3 liters of oil at an initial temperature of 392 deg. F. The sample remained in the oil bath with occasional agitation until noticeable ebullition of water ceased. The hot oil was circulated constantly; its temperature usually fell from the initial 392 deg. F. to a low of 356 to 365 deg. F. during the 2½ to 3 min. frying period. After the sample was fried, the excess oil was drained and whirled off by rapidly rotating the frying basket. The hot chips were then placed in 1-oz. size double walled glassine bags to prevent moisture absorption.

Pretreatment

Water or sodium chloride solutions in stainless steel beakers were heated to the desired temperatures, and baskets of raw potato slices were immersed in the baths and vigorously agitated during the period of treatment. The treated tuber slices were drained and then fried.

Results and Discussion

In Fig. 2 is presented the oil content of chips from a representative lot of Irish Cobbler potatoes grown on muck soil and tested through the 1944-45 season. Note that the freshly dug tubers picked up an extremely high level of oil, that this dropped sharply until January and then rose slowly but never approached the initial high levels. In the following year Irish Cobblers showed the initial drop in oil content, a substantial rise in oil uptake until March, followed by a steady decrease. Sequoia and Burbank tubers did not give such marked seasonal shifts, and Chippewa, during the 1945-46 season, gave chips of almost constant oil content.

Figs. 3a and 3b present analyses of tubers and the oil content of chips from Irish Cobbler potatoes during the 1945-46 season. An increase in chip ash was usually accompanied by a decrease in oil, or vice versa.

The curves of Fig. 3b show that total sap nitrogen and trichloroacetic acid soluble nitrogen tend to vary in the same manner, but that their variation apparently is not connected with the variation in oil content of the chips. Tuber tissue nitrogen and chip nitrogen remain much more nearly constant. The quantities of ammonia, glutamine and asparagine in the sap are not given in the figure; they did not seem to bear any relationship to the oil content of the chips.

Warm-Up Period

The effect of the warm-up period, often employed to lower the sugar content of stored potatoes, on the uptake of oil is shown in Fig. 4. Tubers stored at 44.6 deg. F. were moved to 77 deg. F. storage for the interval indicated before frying. During this period the Cobbler variety showed a marked increase in oil absorption on cooking whereas Chippewa showed the opposite response.

As regards varietal differences and oil uptake it would be our general observation that tubers of low moisture content, such as Cobbler, usually take up less oil than tubers of high water content, for example Chippewa.

The maintaining of sound tubers in a dormant state by storage at a constant temperature of 44.6 to 46.2 deg. F., as discussed by Denny and Thornton,[1] could prevent the losses incurred when they normally break dormancy or when attempts are made to desugar heavily sprouted but "cold' tubers by a warm-up period. It would seem feasible by proper storage, to maintain low cost tubers purchased in the fall market in sound condition until the peak demand for chips in June and July. This is particularly desirable since the immature early tubers usually take up large amounts of oil on frying, and produce an easily crumbled chip.

Limited experiments were conducted to determine whether the maintenance of dormancy by treatment of tubers with the methyl ester of naphthaleneacetic acid[6] would influence their absorption of oil. Variations between the oil content of chips from treated and untreated tubers were within the experimental

Salt, Temperature and Time Affect Oil Uptake in Making Chips

TABLE I—INFLUENCE OF SALT on Oil Uptake by Potato Chips

Variety	Oil in chips—percent: Cold water wash	3 min. boiling water	2 min. boiling 5% NaCl	2 min. boiling 10% NaCl
Irish Cobblers, Red River Valley	34.6	52.4	25.8	23.7
Chippewa, sandy loam, N. Wis.	38.1	48.3	34.5	32.5
Chippewa, sandy soil, N. Wis.	38.7	44.8	31.7	31.1
Irish Cobblers, sandy loam, N. Wis.	40.0	47.5	34.8	32.0
Irish Cobblers, sandy soil, N. Wis.	31.1	42.0	29.4	26.4
Irish Cobblers, Antigo silt loam	31.1	42.0	30.0	27.5

TABLE II—INFLUENCE OF PRETREATMENT TEMPERATURE on Oil Uptake

Variety	Oil in chips—percent: Cold water wash	4 min. boiling water	3 min. boiling 10% NaCl	10 min. 194 deg. F 10% NaCl	10 min. 176 deg. F. 10% NaCl	10 min. 158 deg F. 10% NaCl
Irish Cobbler, sandy loam	41.8	47.5	33.5	38.4	41.5	35.8
Chippewa, sandy soil	35.0	42.8	26.5	35.2	33.3	33.4
Irish Cobbler, sandy soil	34.7	42.1	26.6	33.2	33.3	31.0
Irish Cobbler, Red River Valley	33.2	39.5	27.2	38.5	32.3	31.3

TABLE III—INFLUENCE OF TIME and Temperature of Pretreatment on Oil Uptake

Pretreatment	Oil in chips—percent: Boiling	194 deg. F.	176 deg. F.	158 deg. F.	140 deg. F.
4 min. water	41.7	40.2	42.4	40.7	36.7
10 min. water	——	44.0	43.6	38.8	36.0
4 min. 5% NaCl	32.5	37.0	35.0	36.7	29.7
10 min. 5% NaCl	——	26.0	38.2	37.4	33.1
4 min. 10% NaCl	32.9	37.0	32.5	27.8	27.2
10 min. 10% NaCl	——	36.0	38.5	29.0	27.7

Cold water wash control—35% oil

TABLE IV—RELATION OF PRETREATMENT CONDITIONS to Oil Uptake

Pretreatment	Oil in chips—percent: Boiling	203 deg. F.	194 deg. F.	185 deg. F.	176 deg. F.	167 deg. F.
4 min. 10% NaCl	30.5	31.1	29.8	31.0	30.2	29.8
4 min. 10% NaCl 10 min. cold 10% NaCl	28.3	31.8	26.6	25.2	29.0	28.2
2 min. 10% NaCl	27.9	27.6	29.6	29.0	28.9	27.7
2 min. 10% NaCl 10 min. cold 10% NaCl	24.5	30.2	30.4	28.7	29.2	30.6
2 min. water	41.8	38.0	39.2	37.7	38.7	38.5
2 min. water 10 min. cold water	43.6	43.7	44.3	42.4	37.9	35.7
2 min. 10% NaCl 10 min. cold 5% NaCl	32.0	33.2	32.4	30.9	35.7	34.9

Cold water wash control—35.6% oil

TABLE V—INFLUENCE OF PRETREATMENT on Oil Uptake by Cold Tubers

Variety	Oil in chips—percent: Cold water wash	2 min. 185° F. 10% NaCl	2 min. 185° 10% NaCl 5 min. cold 5% NaCl	2 min. 185° water	2 min. 185° water 5 min. cold water	2 min. 185° water 5 min. cold 5% NaCl
Irish Cobbler, Red River Valley	34.8	28.8	31.4	44.5	42.4	36.3
Irish Cobbler, sandy soil N. Wis.	31.9	24.0	28.8	39.7	40.1	32.9
Irish Cobbler, sandy loam N. Wis.	39.6	34.8	33.0	46.4	53.0	42.3
Chippewa, sandy soil N. Wis.	38.5	32.8	38.2	52.0	39.9	41.1
Chippewa, sandy loam N. Wis.	41.3	33.1	38.2	49.1	51.7	42.2
Irish Cobbler, Antigo silt loam	30.5	31.6	30.4	37.8	37.7	...

TABLE VI—INFLUENCE OF SALT CONCENTRATION and Time of the Prefrying Treatment at 185 deg. F.

Treatment	Oil in chips—percent: Sample No. 1	Sample No. 2	Sample No. 3
Cold water wash	28.9	26.2	33.2
2 min. water	33.4	34.9	38.4
2 min. 5% NaCl	21.7	24.8	24.9
2 min. 7.5% NaCl	21.7	22.4	23.6
2 min. 10% NaCl	22.3	27.9	28.9
30 sec. 7.5% NaCl	30.0	28.0	30.4
30 sec. 10% NaCl	26.3	34.0	29.0

TABLE VII—INFLUENCE OF TIME AND TEMPERATURE of Prefrying Treatment on Oil Uptake of Chips from Warmed Irish Cobbler Potatoes

Treatment	Oil in chips—percent: Boiling	203 deg. F.	194 deg. F.	185 deg. F.
Sample No. 1				
30 sec., 7.5% NaCl	24.4	29.1	26.5	25.8
1 min., 7.5% NaCl	25.0	22.1	24.1	23.8
2 min., 7.5% NaCl	21.8	21.1	21.6	19.0
Sample No. 2				
30 sec., 7.5% NaCl	26.0	28.8	34.1	28.1
1 min., 7.5% NaCl	27.0	26.5	26.9	22.8
2 min., 7.5% NaCl	24.1	26.1	25.9	23.0
		Beginning	After 5 hours	
Sample No. 1 cold water wash		30.8	28.8	
Sample No. 2 cold water wash		31.0	32.4	

TABLE VIII—UPTAKE OF OIL by Chips Fried in Corn Oil and Hydrogenated Vegetable Oil

Treatment	Oil in chips—percent: Sample No. 1	Corn oil No. 2	Corn oil No. 3	Hydrogenated vegetable oil No. 1	Hydrogenated vegetable oil No. 2	Hydrogenated vegetable oil No. 3
Cold water wash	32.1	36.1	31.7	36.7	34.8	35.0
	32.7*	30.0*	29.3*	—	—	—
30 sec. 185 deg. F., 7.5% NaCl	27.2	27.6	25.2	—	—	—
2 min. 185 deg. F., 7.5% NaCl	25.4	25.7	23.6	30.1	27.7	28.9
30 sec. boiling, 7.5% NaCl	26.6	29.0	24.0	—	—	—
2 min. boiling, 7.5% NaCl	27.0	26.8	24.4	29.0	27.8	26.1
2 min. boiling water	32.2	37.0	36.5	36.1	34.8	36.1

* These three samples were fried after having been in water for 24 hours.

TABLE IX—INFLUENCE OF FRYING TEMPERATURE on Frying Time and Oil Uptake for Three Prefrying Treatments

Initial frying temp.	Oil in chips—percent: Cold water wash	2 min./185 deg. F. 7.5% NaCl	30 sec./185 deg. F. 7.5% NaCl	Average frying time, minutes
392 deg. F.	29.2	22.2	30.2	2.5—3
374 deg. F.	31.8	19.6	26.0	3 —3.5
356 deg. F.	28.1	21.3	24.9	3.5—3.7
338 deg. F.	32.5	21.4	22.8	4 —4.5
320 deg. F.	32.1	23.0	27.1	5
302 deg. F.	30.7	20.3	23.5	6

TABLE X—OIL UPTAKE BY POTATO CHIPS in Four Semi-Commercial Runs

Pretreatment	Percentage of oil: Run 1	Run 2	Run 3	Run 4
Cold water wash	31.6	31.2	27.8	27.7
30 sec. 185 deg. F. 5% NaCl	30.1	25.5	—	—
2 min. 185 deg. F., 5% NaCl	28.3	29.3	—	—
30 sec. 185 deg. F., 7.5% NaCl	27.6	28.0	26.0	27.2
2 min. 185 deg. F., 7.5% NaCl	27.5	26.5	25.4	21.2
30 sec. 185 deg. F., 10% NaCl	—	25.0	—	—
2 min. 185 deg. F., 10% NaCl	—	23.7	—	—

TABLE XI—INFLUENCE OF CATIONS on Uptake of Oil

Treatment	Oil in chips percent
Cold water wash	35.6
4 min. boiling water	40.1
3 min. boiling 10% NaCl	32.7
3 min. boiling 10% $CaCl_2$	26.9
3 min. boiling 10% KCl	28.2

error of the method. Likewise the breaking of dormancy of the tubers with ethylene chlorohydrin [7] did not appreciably alter the oil uptake.

Pretreatment of Slices

During the 1946-47 season our efforts were directed to pretreatment of tuber slices to decrease their oil uptake upon frying. All samples, unless otherwise noted, were fried in the laboratory under well controlled conditions.

Patton and Pyke [4] have indicated that color can be lightened by hot water processing of chips before frying. When we applied a similar treatment it resulted in a substantial increase in the uptake of oil. Since it is difficult to salt chips with any uniformity, we considered the possibility of brine treatment for salting and made tests concurrently with the hot water processing. Surprisingly, a hot brine treatment decreased the oil uptake, whereas the hot water treatment increased it. The brine method seemed to hold the threefold promise of a means to achieve uniform salting, color reduction and decreased oil absorption. Hence it was studied with numerous variations on many samples of tubers.

Table I shows increased oil uptake by chips when pretreated with hot water and a decrease when hot salt solutions were used. Six lots of tubers were tested; the frying medium was corn oil with a temperature of 392 deg. F. at the time the slices were added. All tubers produced good, light-colored chips.

The use of saturated sulphur dioxide solutions between 86 and 149 deg. F. for a 10 min. time interval caused good color removal above 104 deg. F. on chips from tubers high in sugars and amino acids, but was accompanied by a large rise in oil uptake. Four minutes' treatment in the same temperature range was insufficient to prevent color formation in the chips. The addition of 10 percent sodium chloride to the pretreatment bath did not depress the oil uptake below that of the control, even with the 4 min. treatment. The possibility of damage to the oil by the sulphur dioxide was not investigated.

Sodium Chloride Solution

The greatest depression in oil uptake was obtained with 10 percent boiling sodium chloride. Data in Table II show a rather poor response with the exception of the 3 min. treatment in boiling sodium chloride solution. Later experiments proved that the poor results at the lower temperatures were caused by insufficient agitation during pretreatment and an excessively long pretreatment time. Tubers used in this experiment had been held at a temperature of approximately 77 deg. F. for 6 weeks prior to their use. Chips produced were of excellent color.

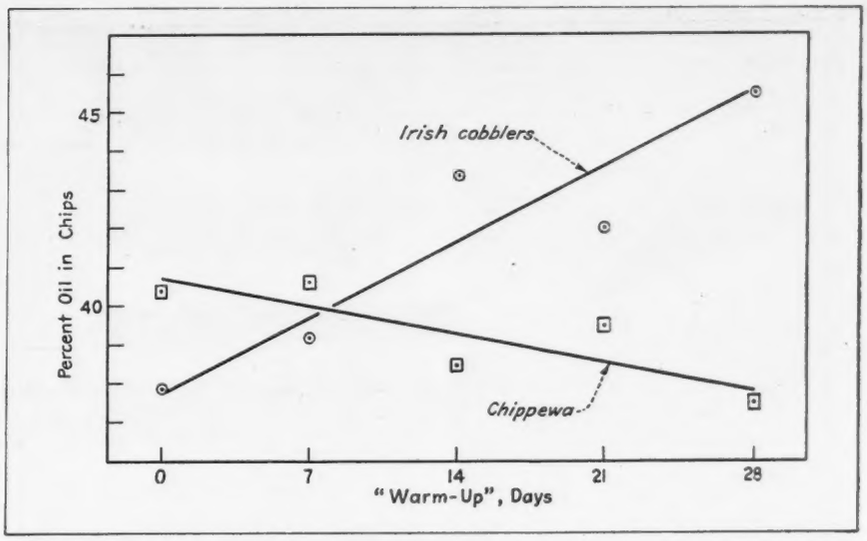


FIG. 4. EFFECT OF "WARM-UP" PERIOD on oil uptake. Tubers stored at 44.6 deg. F. were moved to 77 deg. F. storage and held for time indicated before trying.

Time and Temperature

Table III lists data on the effects of time, temperature and sodium chloride concentration on the uptake of oil. The Irish Cobbler potatoes used had been stored at 41 deg. F. for 5 weeks prior to their use and hence should have had a high sugar content. Good color removal was observed at 176 and 194 deg. F. particularly with the 10 min. water pretreatment; the color was less satisfactory following the 140 and 158 deg. F. treatments. Efficient color removal was at the expense of increased oil absorption, however. Treatments beyond 4 min. with boiling sodium chloride seem undesirable because the samples become thoroughly cooked. Another objection is an effect that might be referred to as "case-hardening"; the surface of the chip becomes excessively hard and brittle when subjected to long periods at high salt concentrations and elevated temperatures.

The use of shorter periods of pretreatment at elevated temperatures followed by a low temperature wash was investigated using Irish Cobbler potatoes stored for 6 weeks at 41 deg. F.; the data are presented in Table IV. Most effective color removal was found when a hot water prefrying treatment in the 176 to 212 deg. F. range was followed by a cold water wash.

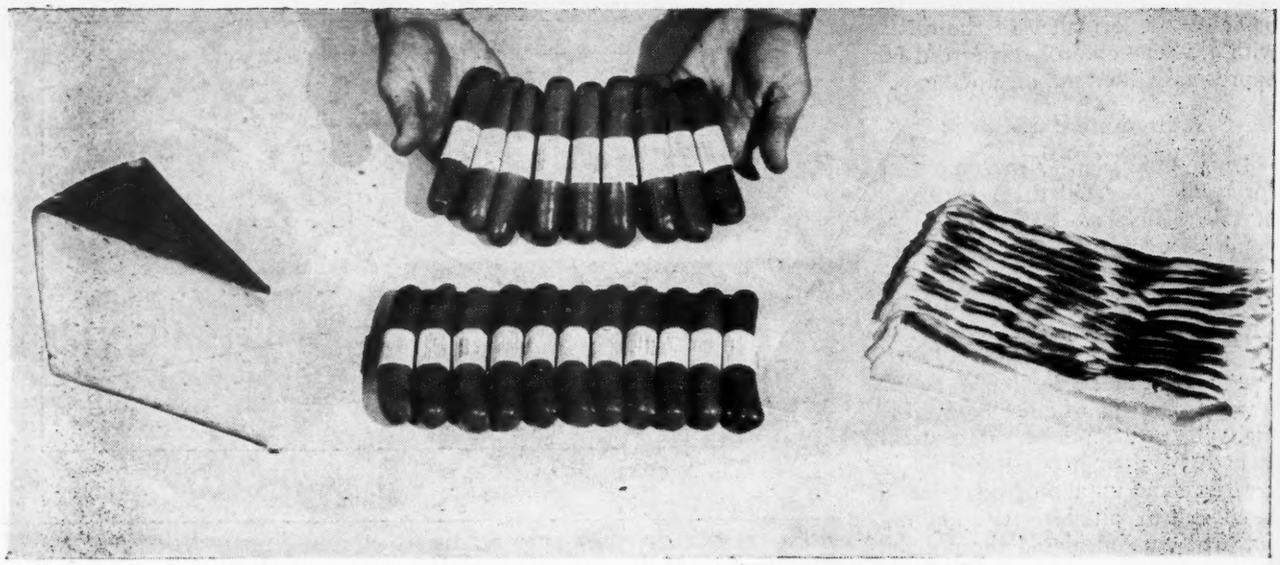
When a cold 5 percent sodium chloride wash followed the hot 10 percent sodium chloride pretreatment, through the same temperature range, color removal was not as satisfactory, but in contrast to the hot water pretreatment oil uptake was depressed below the control. Similar results were observed when various tuber lots were used as is indicated in Table V. These tubers had been held at 44.6 deg. F. for 4 months prior to frying and were high in reducing sugars and free amino acids. It is apparent that the 2 min. treatment at 185 deg. F. with 10 percent sodium chloride reduced the oil uptake substantially, and that the hot water treatments had the reverse effect. A cold 5 percent sodium chloride bath following the hot water treatment was somewhat helpful in reducing oil uptake.

Optimum Concentration

Since 5 percent sodium chloride did not produce a sufficiently salty chip and 10 percent sodium chloride produced too salty a chip, the time interval and sodium chloride concentrations were rechecked as is shown in Table VI. Two minutes in 7.5 percent sodium chloride was found to produce a product of satisfactory flavor. Thirty seconds in a 10 percent solution was also found satisfactory. The 2 minute time interval permitted better control of the process, however, and yielded chips of lower oil content. Verification of the effectiveness of the 185 deg. F. temperature is indicated in Table VII. Irish Cobblers were used, samples 1 and 2 having been held at room temperature for 2 weeks and 3 months respectively. The oil content of chips from tuber slices washed in water for a few minutes and for 5 hr. were not greatly different.

Tables VI and VII indicate that

(*Continued on page* 193)



Cheese, Bacon Go Into Franks

Manufacture is similar to that for regular wieners. Only difference is that new ingredients are added, giving product a distinctive flavor

SOMETHING new has been added to the hot dog—smoked bacon and mild cheddar cheese.

These new additions to the regular beef, veal, pork and seasoning give the skinless franks a rich, juicy and smoky flavor.

The new franks were developed by happy coincidence, rather than through research, by J. F. Sherin, Golden State Meat Co., San Jose, Calif. He wanted to find out how frankfurts would taste if cheese were added to the usual meat emulsion.

When the first batch of cheese-bacon wieners was made, he found that they had a new and interesting flavor. Soon after, these franks were made on a commercial basis, and the new product immediately won consumer acceptance.

Made Like Regular Franks

While the company does not disclose the formula, the method of manufacture is identical to that for making the regular frankfurts. The only difference is that cheese and bacon are added to the new wiener.

At Golden State, butchers first bone the veal, beef and pork. Frozen pork is cut up. Each variety of meat is then ground separately in a meat grinder.

In the next step, the ground meats are mixed in a silent cutter to make a 150 lb. batch containing 35 percent beef, 35 percent veal and 30 percent pork. Beef and veal are added first, and mixed to a smooth texture at 48 deg. F. with the aid of flake ice. Next the pork is added and mixing continues until the meat emulsion is smooth and reaches 55 deg. F. (using more flake ice, if necessary).

The silent cutter is designed to comminute the meat into very fine particles by revolving it in a bowl past rotating knives.

At this point, the cheese and bacon are added together with the same spices and curing agents used for the regular franks. Here, the formula has been changed so that the flavor of the cheese and the smoked bacon can be clearly tasted.

New Ingredients

Wheels of cheddar cheese are cut into loaves about 4 lb. each. About 15 percent cheese and 10 percent sliced bacon or bacon ends are added to the 150 lb. batch of meat emulsion. Mixing continues in the silent cutter until the cheese and bacon particles are about 1/16. in. square.

It is important not to chop the bacon and cheese ingredients too fine, for they then would not be visible and loss of flavor would result.

From the silent cutter, the emulsion is loaded into a vat, and wheeled to the stuffing machine. Here it is extruded, under pressure, into a cellulose tube. Now the emulsion has been formed into a frankfurt. Operators then feed the tube to the automatic linking machine, which ties it to form the frankfurter.

Smoking and Cooking the Franks

The frankfurts are then racked and wheeled into smoke rooms, where they are smoked 1 to 2½ hr., using oak smoke. From the smokehouse, the franks are moved into Jordan cookers on mobile racks. Here the frankfurters are cooked for 10 min. in steam at 165 deg. F.

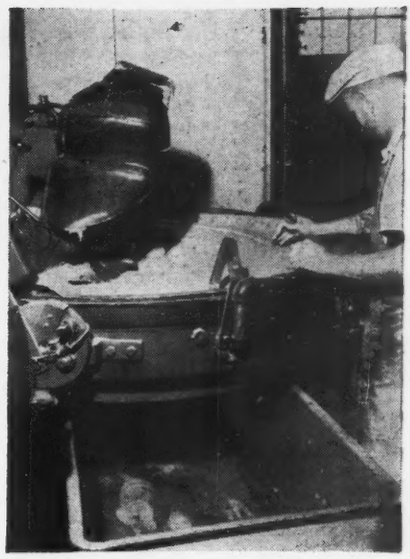
After the wieners are cooked, they are carried into a cooler, and sprayed with cold water. The franks are then stored in an air-conditioned cooler at 40 to 45 deg. F. before they are packaged.

Operators next remove the cellulose casing from the franks, making them skinless. Other operators feed the skinless frankfurts into a Cartridge-Pak banding machine, where they are banded together. These bands of franks are finally layer-packed, in cartons, weighing 6 or 10 lb.

Regular and prompt deliveries are made to wholesalers and retailers in refrigerated railroad cars or trucks.

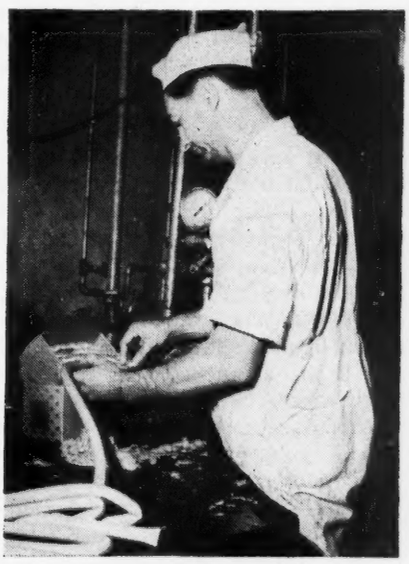
1. BONING beef and veal and chopping pork trimmings are first step.

2. MACHINE-grinding beef, veal and pork separately through ⅛ in. plate.

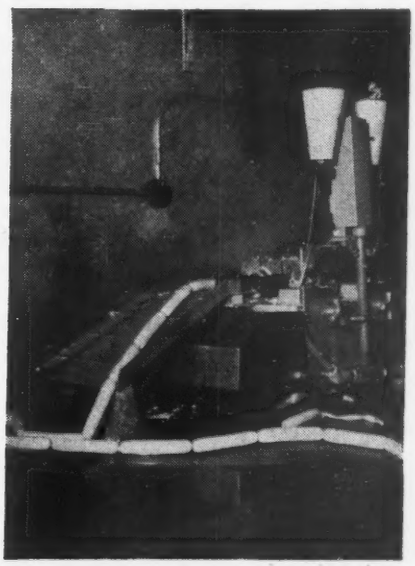


3. TAKING temperature of meat emulsion as it is being chopped in cutter.

4. BACON and cheese are added and emulsion is then dumped into vats.

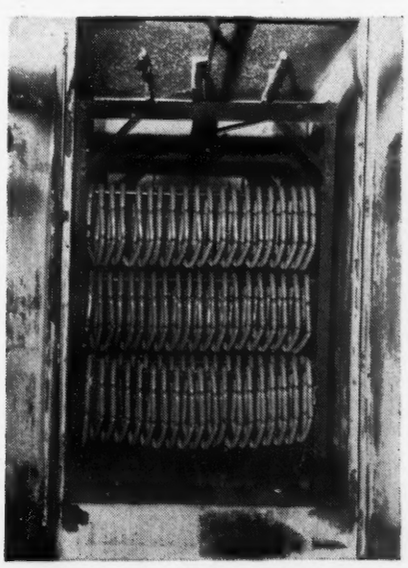


5. STUFFING emulsion into cellulose casing, which acts as temporary skin.



6. FORMING stuffed casing into frankfurts on linking machine.

7. SMOKING frankfurts to uniform flavor and color in oak smoke.

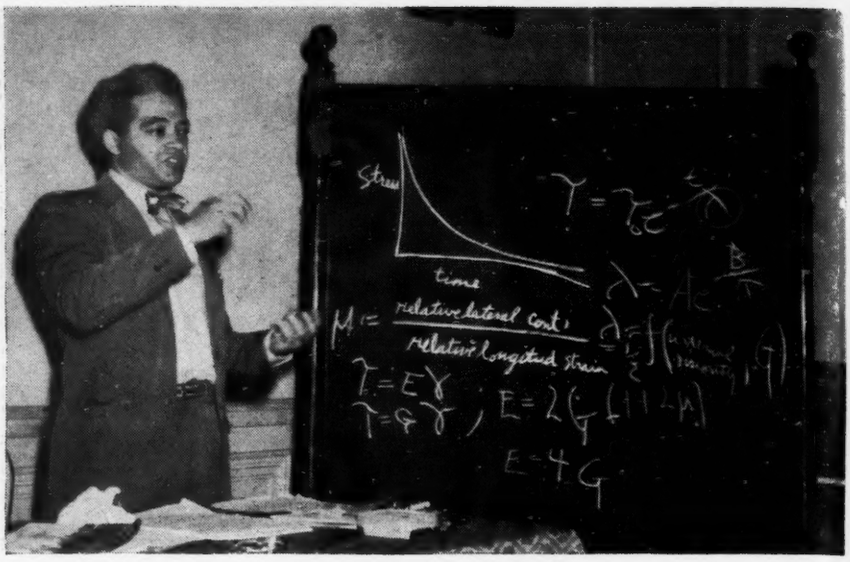


8. COOKING wieners in Jordan cooker. Franks are cooked in steam.

9. FRANKS are banded together, weighed and packed in cartons.

Highlights Of IFT Conference

Part II—Additional reports on Philadelphia technical sessions: Ion exchange progress, food acceptance tests, high pressure hydrolysis, glutamate in vegetables . . . Exhibits reviewed



THEORETICAL BASIS for designing stress and strain instrument for gels is explained by Rudolph Speiser, Ohio State University, in discussion of physical chemistry of gelation of high polymers, first of seven papers on behavior of pectinates. Speakers described properties of pectinates demethylated by acid, by alkali, by enzymes and by concentrated ammonia. Practical conclusion is that materials should be tested before use, since each partially demethylated pectinate has its own qualities.

PROGRAM INTEREST at the Philadelphia conference was about equally divided between general sessions and events, and the special technical sessions. General meeting reports were published in July FOOD INDUSTRIES, along with summaries of some of the technical discussions.

The 1948 meeting report is concluded in this issue with summaries of technical sessions on special topics and a review of the commercial exhibits.

Ion Exchange Progresses

Interest in the special session on ion exchange and its applications was so great that there was standing room only. And those who attended were not disappointed.

"Ion Exchange Technique Applied to the Food Industry" was the subject of a paper presented by James C. Winters, Resinous Products & Chemical Co. Recently developed synthetic cation and anion exchangers, Mr. Winters said, will soon make significant new contributions to food processing. These new resins are stable and have a higher capacity than the older types.

Beginning with the demineralization of water for improving the quality of processed foods, synthetic ion exchange resins already have progressed through many de-ashing and purification procedures to the production of vitamins and amino acids.

Sugar value recovery from fruit wastes by ion-exchange now seems slated to reach respectable proportions. That is the prediction of B. H. Dickinson, Chemical Process Co., who presented the paper "Commercial Ion Exchange Purification of Sugar-Bearing Solutions." Use of exchangers to purify corn sugar liquors has progressed. Increased shelf-life and better quality are the benefits. In treating sugarcane juice, ion exchange is handicapped by the high cost of the regenerants in many cane-growing areas and by the cost of refrigeration to cool the juices to prevent inversion. The role of ion exchange in color, odor, and taste refining of sugar-bearing solutions has been an unforeseen but important development.

In his paper, "Ion Exchangers in Food Processing," A. B. Mindler, The Permutit Co., summarized the ion exchange processes as: (1) Removal of undesirable electrolytes, (2) addition of specific ions, (3) separation of electrolytes, (4) recovery of valuable electrolytes, and (5) catalysis.

Widest application in the food industry has been in treatment of ingredient water and of water for cooling, washing and for boilers. But the process has also been employed to produce soft-curd milk, decrease browning in evaporated milk, check the precipitation of tartrate in grape juice, and remove lead from maple sirup. High-grade pectin is recovered from grapefruit peel. In making wine, the iron may be precipitated by an alkali, then the wine acidified in a hydrogen exchanger. Citric, lactic and malic acids are readily recovered from solutions, as is tartrate. Much work has been done in the separation of amino acids by means of ion exchange resins.

Another potential application is in the production of synthetic flavors and essences. In fact, there are hundreds of possible uses of ion exchange, although some are not commercially feasible.

Limitations Listed

Mr. Mindler also cited some limitations to ion exchange. It cannot be used in continuous operation. It is best where concentration of impurities is under 1 percent. And the amount of regenerant required is greater than the theoretical quantity.

"Use of Ion Exchangers in By-Product Recovery From Pineapple Waste" was the topic of a paper by George E. Felton, Hawaiian Pineapple Co. Introduction of stable high-capacity resins opened up new possibilities in removing valuable materials from cannery wastes.

Pineapple shells and other waste products are pressed to yield a by-product juice which contains large quantities of sugars and organic acids. After liming and filtering to remove part of the citric acid as calcium citrate, the juice is passed through cation and anion exchanger beds to remove most of remaining bases, acids and colored impurities.

The resulting sugar solution is concentrated to a sirup which is used on the canned pineapple. The exchangers are regenerated with chemical solutions from which additional calcium citrate is recovered.

(For detailed discussion of ion exchange, see "Ion Exchange Finds New Uses", page 85, May FOOD INDUSTRIES.)

Olfactory Acuity

In a paper prepared by Franz R. Goetzl, Permanente Foundation, olfactory acuity in humans was considered. The paper was read by George Gelman, of the Quartermaster Food & Container Institute. The point was made, of significance in working with organoleptic tests, that olfactory acuity in humans has been found to be positively correlated with strength of appetite.

The triple comparison procedure—with two samples the same and one different—gives good results and is helpful in selecting personnel for flavor tests. If the two like samples are scored differently, one can assume that the judge is guessing, or his flavor judgment is off for that particular test.

Derivation of numerical food quality grades was put on a rational basis by R. P. Plank, Karlsruhe, Germany, who is now visiting professor at University of Texas. Numerical grades for any single food property should be proportional to the quality expressed in descriptive terms, he said. The grades of single properties should be weighted by using specific multiples and then added to form a total grade.

Total subjective and objective grades should be combined with biological value and external state of a commodity to calculate the final grade, again using specific multiples. This final grade is the quality index.

Amino Acid Session

Three types of practical problems were dealt with in the symposium on amino acids. One was a discussion of ways to control browning, another the possibility of high-pressure hydrolysis of proteins, a third, the use of glutamate in seasoning vegetables.

Ways of limiting undesirable browning of the carbohydrate-amino-acid type were listed by M. L. Anson, Continental Foods, Inc. One method is based on the relationship between rate of browning and moisture content.

Discoloration is usually fastest in the 10-15 percent moisture range. Accordingly, drying to 5 percent moisture will inhibit the reaction. Drying to low moisture is especially important if the product is high in browning reactants. Conversely, if the starch content is high, then higher moisture levels are permissible.

Extreme drying, however, may do more damage than the browning. It may be too expensive, or not feasible owing to limitations in the equipment. If the drying approach to the problem is decided on, then adequate packaging must be provided .

Browning can be inhibited by adding water to the product. There is no problem with most canned products because the reactants are in dilute solution. Similarly, higher moisture levels are desirable in dried apricots, although here oxygen should be excluded, and it may be necessary to use ethylene oxide to inhibit molds.

With respect to the use of sulphite, the speaker emphasized the fact that more is accomplished than the inhibition of mold growth. Also, restrictions on use of the material must be taken into account.

Another method of combatting browning is by substituting sucrose, which is non-reducing, for glucose wherever possible in the formula. Again, proper selection and handling of potatoes will minimize the glucose content, simplifying browning control. The converse situation occurs if amino acids are used for flavoring purposes, since the potential browning reactants are then increased.

Advantage can be taken of the relation between the rate of browning and pH. Best illustration is the Western Regional Research Laboratory's dried egg process. Here the product is acidified. But to preclude flavor change, alkali is packed separately, sufficient to neutralize the acid. This process is highly successful.

Changes in processing and storage methods will minimize browning damage. One approach is to carry products through the dangerous moisture range of 10-15-20 percent as quickly as possible.

In canning, if severe processing conditions cannot be avoided, then prompt cooling should be emphasized. Likewise, attention should be paid to conditions in the warehouse, which should be cool and well ventilated.

In distribution, the first-in, first-out plan of stock handling will avoid accidentally prolonged high temperature storage. Similarly, it is advisable to allow for excessively high freight car temperatures in scheduling shipments of sensitive products in the summer.

Laboratory testing of products subject to browning is relatively easy, the speaker said. Color extraction methods may be used, or taste tests performed, that do not involve any elaborate preference procedure.

High Pressure Hydrolysis

In reporting experiments on high pressure hydrolysis of proteins, Lloyd A. Hall, Griffith Laboratories, held out hope for a new approach to the problem of hydrolysis manufacture. His data suggest that continuous equipment might be devised to take the place of batch hydrolysis kettles now used almost universally.

"Continuous hydrolysis would reduce the length of time the material is in the hot zone," said Dr. Hall. "Continuous operation might revolutionize the production of hydrolysates."

Dr. Hall detailed a series of tests on the hydrolysis of wheat gluten at various pressures. This material is 85 percent protein and contains 10 percent carbohydrate. Pressures up to several hundred pounds were used, with various concentrations of hydrochloric acid and other catalysts. In summarizing his findings on tests with low-acid concentrations, or without acid, Dr. Hall said: "Temperature and pressure together will not hydrolyze protein completely, unless the acid requirements are satisfied."

The 50-100 psi. pressure range was found optimum for complete hydrolysis without destruction of protein. Conditions regarded as most favorable were given as 75 psi. steam pressure with 16 percent HCl for 15 hours. Tests at the higher ranges of pressure often gave gummy residues.

In summing up his work, the speaker indicated that a continuous production method has definite commercial possibilities "without prior treatment or destruction of the protein."

Food Acceptance Testing

In the session on food acceptance testing, consumer taste perception and taste preferences were reported by Katheryn E. Langwill, Drexel Institute of Technology. Dr. Langwill chose 500 students, selected at random, both men and women, as subjects.

A summary of the results showed that, on the score of perception, some 77 percent of the women, but only 46.7 percent of the men, were able to differentiate between the four basic tastes.

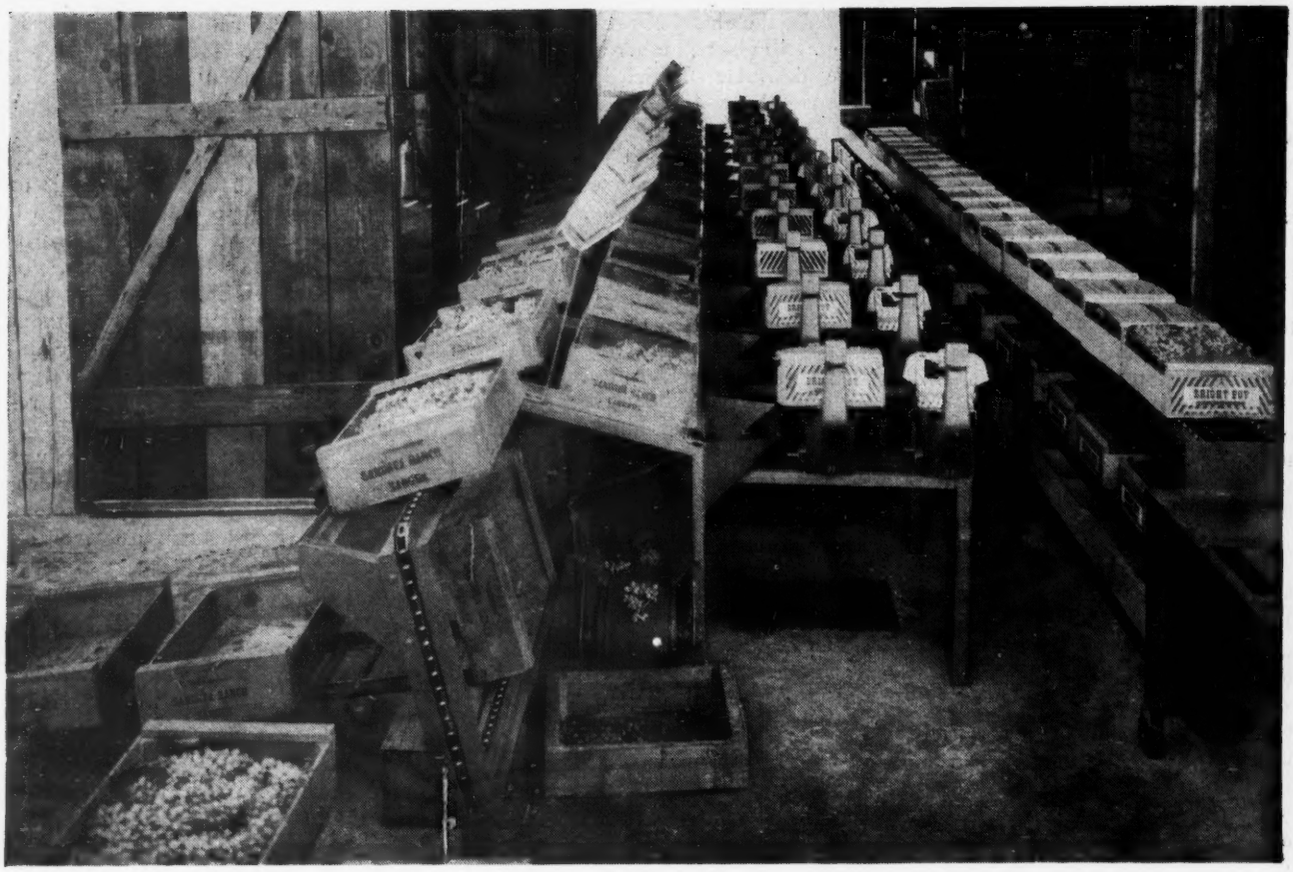
As to preferences, the records indicated that 70.2 percent of the women and 65.5 percent of the men preferred moderately sweet to excessively sweet, while 52 percent of the women and 55.2 percent of men chose moderately salty over the excessive. Slightly sweet was preferred by 17.2 percent of the men and by 13.5 percent of the women.

In sour preferences, 11.9 percent of the women and 5.4 percent of the men chose the excessively sour, 44 percent of the women chose moderately and slightly sour. With the men, however, 57.2 percent preferred slightly sour, 37 percent chose moderately sour.

Glutamate in Vegetables

Practical pointers on the use of monosodium glutamate in the seasoning of vegetables were given in a paper presented by L. B. Sjostrom, Arthur D. Little, Inc. The glutamate itself has no odor, but has a persistent taste. When used in quantities, it produces a tingling sensation, especially on the tip of the tongue.

(*Continued on page* 196)



How It Looks . . .

CONVEYORIZED unit packs 2-lb. consumer packages and 28-lb. institutional boxes at the same time. Line keeps packers constantly supplied with fresh grapes and empty packing lugs, disposes of the culls, and returns empty field boxes for re-use.

Grape Packaging Simplified

Speeds production, reduces labor costs, cuts down on overhead and

By JOHN V. ZIEMBA
Assistant Editor
"Food Industries"

PREPACKAGING of fresh grapes in consumer and institutional size packages has been simplified and accelerated with new mechanized grape packing units recently installed by Henry J. Andreas of Sanger, Calif. Moreover, introduction of these new units has materially reduced labor costs. In conjunction, 2-lb. Cellophane-window consumer cartons have been adopted by Andreas. These are packed 12 to a standard lug box.

The new all-steel handling units for grapes replace the old style wooden benches which have been employed for packing 28-lb. lug boxes. One of the outstanding features of the apparatus is its ability to pack both 2-lb. consumer packages and 28-lb. lug boxes on the same line. The units were developed by the General Nailing Machine Corp., of Sanger, Calif.

With the employment of the conveyorized packing units, all packers are furnished with a constant supply of grapes. One man can supply 18 packers with field boxes filled with grapes, and dispose of the culls. Formerly, one man took care of only eight packers, and this man had to place the boxes of grapes on the wooden benches. Furthermore, there was no simple means of disposing of the culls.

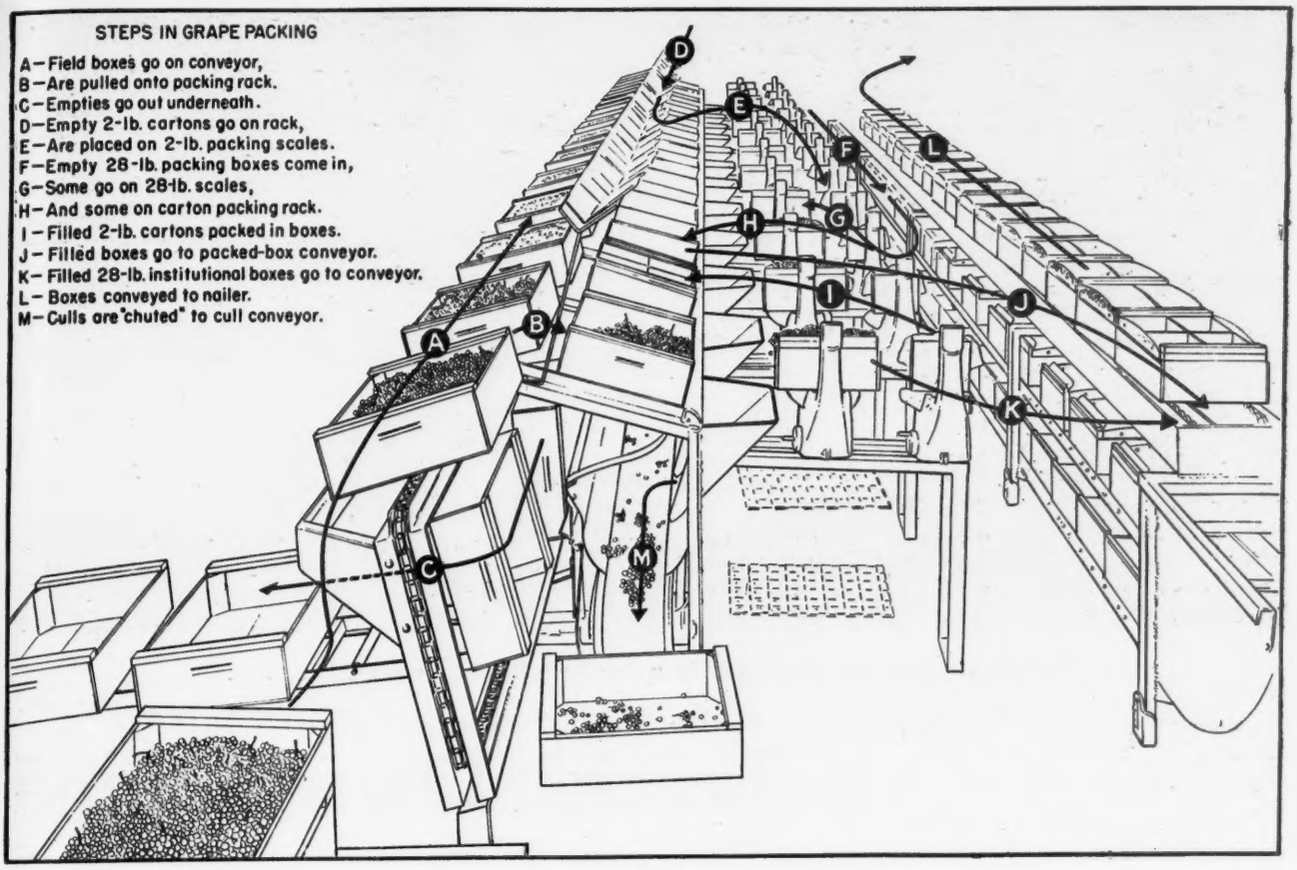
Feeding the cartons to the packers and filling and weighing them is still a manual task, but all other operations are performed by the new packing line which mechanically—

1. Feeds field boxes containing grapes to the packing stations.
2. Supplies the packers with boxes of grapes, as needed.
3. Feeds a steady supply of empty packing lugs to the packers.
4. Returns picking boxes or field lugs for re-use, when empty.
5. Collects culls from all packing stations.
6. Nails lids on lugs packed with fresh grapes, and
7. Feeds finished packs to box cars.

How New Unit Operates

Field boxes of fresh grapes are delivered by trucks to the packing sheds. Here the boxes are unloaded and stacked 8 to 10 boxes high. In these sheds, these field boxes are loaded onto the feed end of the new packing unit, one at a time. Boxes travel on conveyor to packing stations along the line.

Standard packing units contain 12, 15 or 18 packing stations. Each station is equipped with two scales, mounted on a bracket (see drawing). One scale is used to weigh the 2-lb. cartons and the other, the 28-lb. lugs.


STEPS IN GRAPE PACKING
A—Field boxes go on conveyor,
B—Are pulled onto packing rack.
C—Empties go out underneath.
D—Empty 2-lb. cartons go on rack,
E—Are placed on 2-lb. packing scales.
F—Empty 28-lb. packing boxes come in,
G—Some go on 28-lb. scales,
H—And some on carton packing rack.
I—Filled 2-lb. cartons packed in boxes.
J—Filled boxes go to packed-box conveyor.
K—Filled 28-lb. institutional boxes go to conveyor.
L—Boxes conveyed to nailer.
M—Culls are "chuted" to cull conveyor.

. . . And How It Works

SCHEMATIC drawing shows important features of the new fresh grape packing unit as well as the direction in which the field boxes and packed boxes travel. Mechanized unit speeds grape packing operations and reduces labor costs materially.

With Mechanized Packing Unit

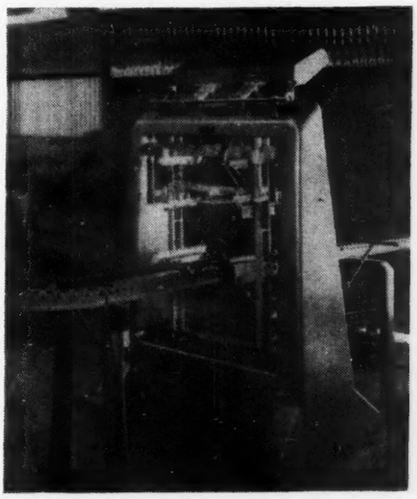
simultaneously handles consumer- and institutional-size packages

Both sizes of packages are put up at the same time because the operation involves sorting from a common stock of grapes. Bunches of grapes are selected first for the consumer package, while the remaining bunches of grapes are packed in the institutional package.

At each packing station, space is provided on the unit for one field box. In addition, there is space for one packing box or lug. Along with these, there is also a hopper and a chute for disposing of the culls which drop onto a conveyor. The culls are carried out of the packing shed, loaded into boxes or tanks, and then hauled to wineries.

After the field boxes are empty, the packers place them on the return conveyor, which carries them out of the packing shed. These boxes are loaded on trucks which return them to the vineyards for re-use.

As the field boxes arrive at the packing stations, the packers pull them down into "working" spaces provided on the unit. After a box has been removed from the feed line, another box automatically moves up and takes its place. This is how the packers are assured of a constant supply of grapes.



LIDDING machine nails down box tops.

Packers are automatically supplied with cartons and packing boxes. The 2-lb. size, knocked-down cartons are assembled on carton forming machines at the rate of 65 a minute. These cartons are then fed to packers via a rack above the packing unit. At the same time, conveyors automatically feed empty packing boxes to the packers.

The packers remove two boxes from the conveyor at a time. One is packed with 12 2-lb. cartons, while the other is placed on a scale and packed with 28 lb. of grapes.

Finally, the packed boxes, containing both the consumer and institutional units, are loaded on the packed-box conveyor. They travel to the lidding machine, where the box tops are nailed in place, and then these finished packs are conveyed to the shipping department or directly to box cars.

SPACE as well as efficiency is a factor with this unit, which . . .

Truck's Own Engine

Lightweight unit is mounted below floor for cooling during running

LIGHT in weight, about 600 lbs., and driven from the truck's propeller shaft without any outside power source such as an auxiliary gasoline engine, the Kold-Trux refrigeration unit offers food processors, requiring refrigerated truck bodies for the distribution of their products, a controlled system of refrigeration with pre-selected temperature settings ranging from -10 deg. to 50 deg. F. The unit also includes an electric plug-in means of operation. This system provides continuous refrigeration when the truck, on which it is mounted, is not in motion, provided a current source of either 110 volts or 220 volts, 60 cycles is available.

Below Floor

Another important feature of the Kold-Trux equipment is that the unit is mounted entirely below the floor of the truck body. Thus the unit does not take up any payload space. It also permits heavier loads to be carried. In this below-the-floor mounting, the equipment compressor and electric motor are protected against dust, dirt or road splash in wet weather by removable metal shields.

The entire unit, consisting of a compressor, condenser, electric motor, refrigerant tank, speed reducer and a hydraulic clutch, together with necessary fittings and belt drives, is mounted on a separate rectangular angle iron framework. To mount the equipment on the truck, which it is to serve, it is only necessary to bolt the framework crosswise of the truck chassis. This mounting makes for an easy installation, and can be made by any competent refrigerator service man.

Refrigerating System

The refrigerant used is either Freon 12 or methyl chloride. The refrigerating cycle of operation is completed by piping the liquid refrigerant to the expansion valve, located inside the truck body. The valve feeds either hold-over plates or finned coils. The boiling action of the liquid in the coils reduces it to a gas, which is compressed by the compressor and turned back to a liquid in the condenser.

The compressor is thus the heart of the mechanism. The method of driving the compressor is both unique and original and is patented under U. S. Patent No. 2,382,667.

Power Propulsion

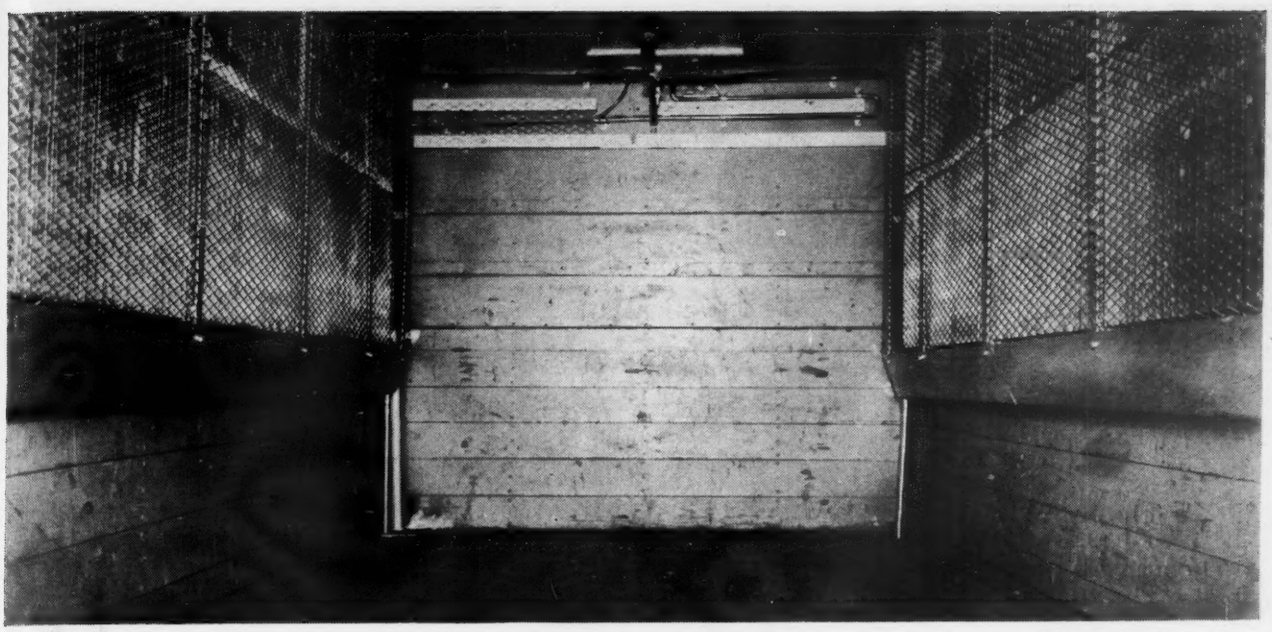
The line of power flow to drive the compressor may be followed by reference to the accompanying illustration showing the refrigerating unit mounted on its separate framework as bolted to the chassis of the truck behind the driver's cab. The truck's propeller shaft extends from top to bottom of the illustration, midway between the side members of the truck frame.

Near the top of the propeller shaft, a pulley, mounted on the shaft itself, drives a second pulley by means of a belt drive. The second pulley, in turn, operates a bevel gear speed reducer in the housing shown on the right of the truck's propeller shaft.

Direct Drive

From the large bevel gear inside the speed reducer housing, a shaft emerges from the left side of the housing and extends across the truck frame to directly drive the two-cylinder V-type compressor outside the truck frame on the left. Also mounted inside the speed reducer housing are a hydraulic piston pump driven directly from the truck's engine and a multiple disk clutch.

When the truck is in motion, refrigeration is supplied by the operation of the compressor until the inside body temperature reaches that set on a thermostat inside the body. Then the compressor should be shut off even though the truck is in motion. This is accomplished by means of a solenoid, which is controlled by the body thermostat



. . . PERMITS the full cubical load area inside the truck to be utilized

Operates Refrigeration

time, while plug-in electric motor refrigerates in lay-up periods

and which in turn by-passes the oil in the hydraulic piston pump inside the speed reducer housing. In this way the clutch—also in the housing—is disengaged, the crosswise compressor shaft does not turn and the compressor stops.

Re-engages Clutch

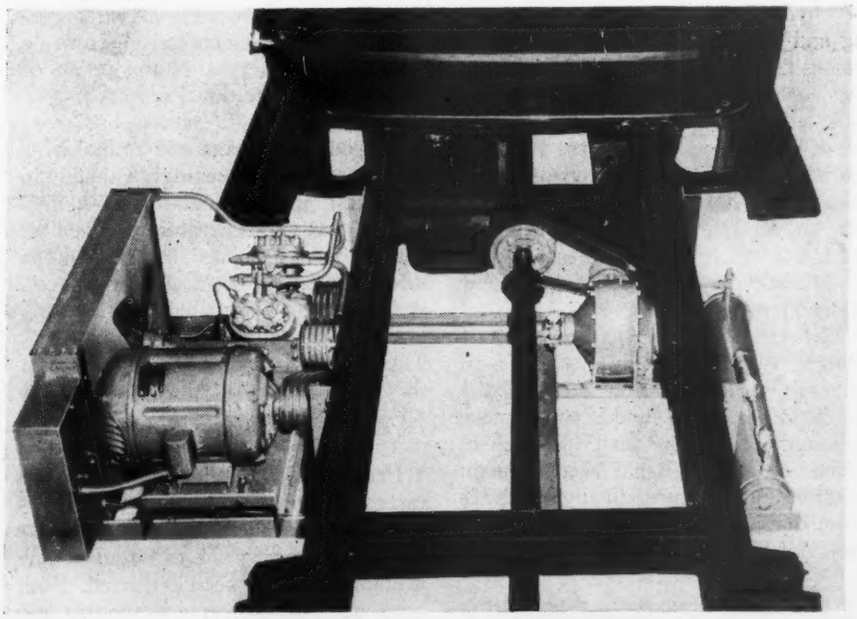
As the temperature again rises inside the body to the top of the range set on the thermostat, the solenoid goes into action. It operates the hydraulic piston pump to re-engage the clutch, turn the compressor shaft and thus operate the compressor.

When refrigeration is desired, while the truck is not in motion and the compressor drive not in operation, the electric motor is plugged into the available outside current source. The motor drives the compressor direct through a series of four double V belts driving through three pulleys. One of the pulleys is fitted with an unidirectional clutch, thus staying engaged in only one direction of rotation.

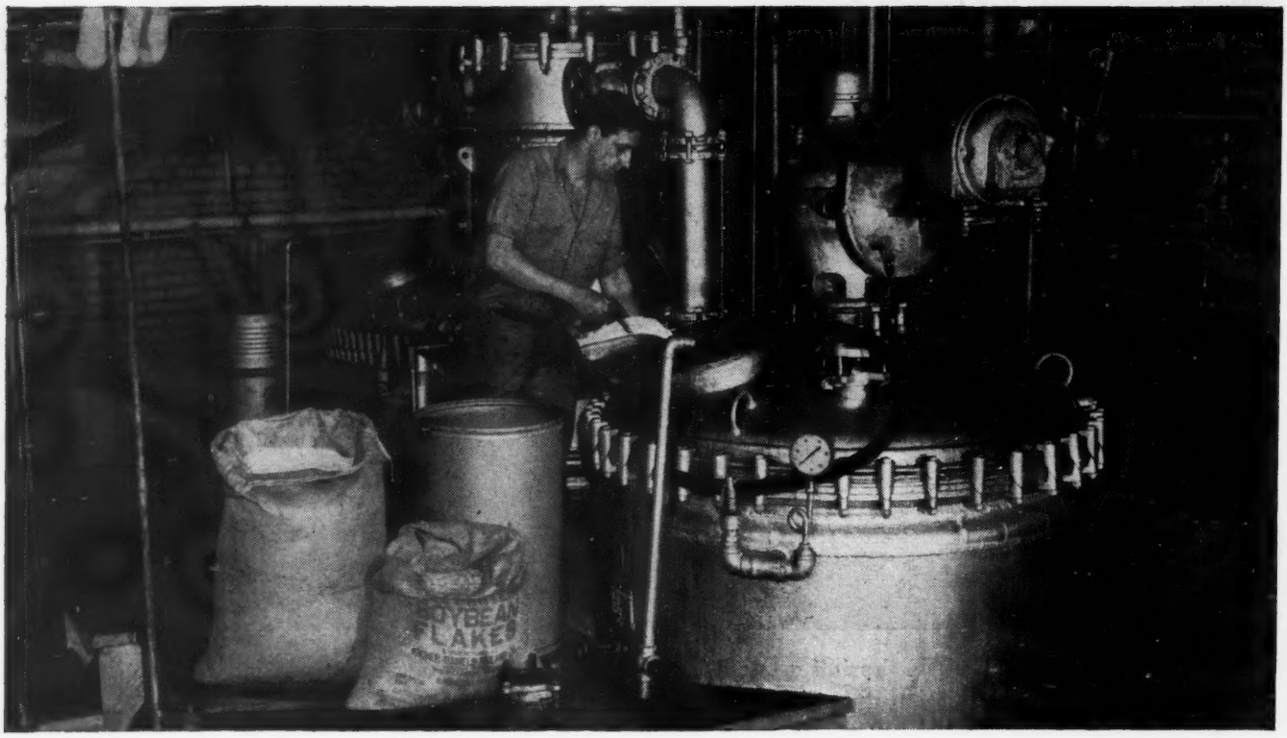
One Way Clutch

When the truck is in motion and the compressor drive is through the truck's propeller shaft, the electric motor's armature does not turn because of the unidirectional clutch. But it does turn when the motor is plugged in to drive the compressor. By this means, it is impossible for both the electric motor and the propeller shaft to attempt to operate the compressor at the same time.

A new and growing use for this type of refrigerated truck equipment is in the distribution of ice, particularly in cube form. These insulated and refrigerated bodies prevent the formation of moisture inside the paper, or cloth bags, in which the cubes are carried, thus preventing the formation of a solid block, as well as avoiding losses through melting.



PROPULSION from the truck's propeller shaft as well as from the plug-in electric motor, at left, can be followed on this illustration. Refrigerant tank is at right.



COMBINATION of proteins—such as wheat gluten, extracted soy flour and casein—may be chosen as raw material for hydrolysis, for which hydrochloric acid is usually used. Dried hydrolysate contains 16-18 percent glutamic acid.

Protein Hydrolysate—Source

Hydrolysates with a combination of all the amino acids are said to give

By LLOYD A. HALL,* Technical Director, Griffith Laboratories, Chicago

FLAVORING of foods with protein hydrolysates has shown interesting and rapid progress in this country during the last decade. Since the production of protein hydrolysates, as such, has reached sizable quantities and use of the material in the food industry attained significant volume, specific information concerning their contribution to food flavor, and particularly regarding their use as a source of glutamate flavors, should be more generally known.

The purpose of the incorporation of protein hydrolysates in foods is to improve the flavor and taste of the products so as to make them more delicious. For more than 40 years, in China and Japan, it has been common practice to use protein hydrolysates from one source or another, as condiments. In the relatively short time that the American food industry has been interested in these flavors, outstanding improvements have been made in their manufacture as the result of chemical and nutritional research.

A voluminous literature has been developed on proteins and amino acids which has been exceedingly valuable in improving the manufacture of hydrolysates. A considerable number of patents has been issued, some under the title-subject, "Protein Hydrolysates", and others designated, "Flavoring Materials From Hydrolyzed Proteins". The numerous patents are evidence of the wide interest in these products.

Two Types

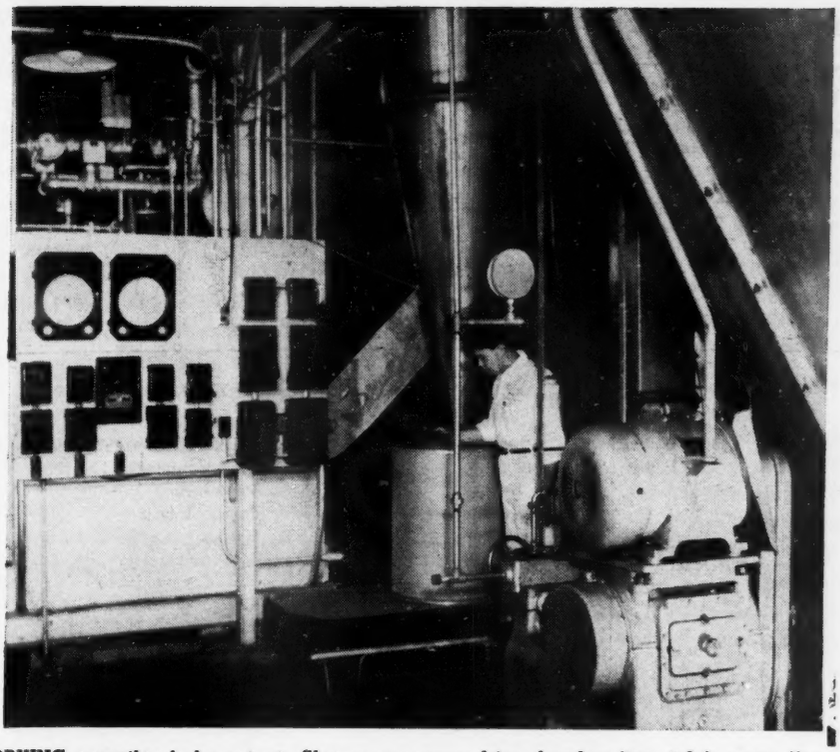
Protein hydrolysates for foods are essentially of two types: (1) Complete acid-hydrolyzed proteins, and (2) acid-hydrolyzed proteins from which glutamic acid has been extracted. Both types are manufactured as liquids and commercially dry powders. This discussion is concerned primarily with the hydrolysates of the first type—the unextracted variety. It should also be stated that soya sauces and other flavoring meat sauces are produced wholly or partially by enzymic hydrolysis and that their production is of appreciable volume.

Protein hydrolysates made with sulphuric acid as the hydrolyzing agent have not been generally acceptable for food purposes, principally because of inferior or undesirable taste factors and their comparatively high production cost.

There has been much written about meat flavor, but the subject still remains far from clear. It is evident that meat flavor is due to something more than monosodium glutamate and that part of the flavor of meat is due to nitrogen bases and slightly volatile organic acids.

Recently, we have found that cooked fresh meat as well as cured meat contains small amounts of amino nitrogen. This indicates that meat flavor, to some extent, is related to amino acids. It is well known that monosodium glutamate contributes much to the develop-

* The author presented a paper on this general subject at a symposium on monosodium glutamate flavors, sponsored by the Quartermaster Food & Container Institute, in Chicago.



DRYING operation is important. Shown are spray drier chamber (top right), pump (foreground), discharge (center), control panel and superheater (left).

Of Glutamate Flavor

preferred quality rating and more acceptable taste

ing of a good chicken flavor in soups and makes vegetarian food more appetizing. We know also that monosodium glutamate contributes not only to chicken flavor, but to meat flavors in general.

Meat flavors have been discussed and advertised as amino acid flavors. This may not be entirely true, but the amino acids which are present in meat protein definitely contribute to the agreeable flavor of this food.

Glutamate Appraised

We have never had the opinion that monosodium glutamate, used alone, was entirely satisfactory for flavoring food products. Experiments have indicated that hydrolysates which have a combination of all the amino acids give a preferred quality rating, a more satisfying flavor, and a more acceptable taste than when only one of the amino acids is present. The only possible exception to this conclusion is the use of monosodium glutamate in chicken soups.

We believe that the "non-essential" amino acids in most instances contribute better flavor than the "essential" amino acids. Certainly, we are agreed, from experimental evidence, that several of the amino acids and their derivatives, exclusive of monosodium glutamate, have flavor significance.

For example, glycine, alanine, proline, leucine, serine, phenylalanine and aspartic acid have varying sweet tastes and contribute flavor. Methionine and cysteine impart definite desirable tastes and when heated provide strong pyrogenic flavors. Valine and tyrosine are slightly bitter.

These observations refer to the dextrorotatory form of the amino acids. Since the four components of taste are described as sweet, sour, salty and bitter, it is obvious that a protein hydrolysate containing all or most of the amino acids has the constituents present to supply full and complete taste characteristics.

In this respect, protein hydrolysate flavors can be compared to a perfume which has been developed into a pleasing, attractive and thought-provoking bouquet by the blending of various aromatic essential oils, which separately would not be attractive, but when blended, give the appealing fragrance which is so alluring. The same comparison can be made of flavors derived from the presence and the blending of amino acid derivatives in a protein hydrolysate.

Choice of Protein

Investigations relative to the improvement of protein hydrolysates have developed definite fundamental information. The importance of the protein hydrolyzed cannot be emphasized too strongly. It has been proved that the protein should be high in total nitrogen, adequate in respect to all the amino acids, and should be specifically selected on the basis of the glutamic acid content to give the maximum of flavor. Commercially, these proteins are wheat gluten, corn gluten, extracted soya bean flour, casein, peanut flour, yeast, dried distiller's solubles, extracted cottonseed meal and fish waste. There are also other proteins. such as egg albumin, that can be and are sometimes used.

Frequently, a combination of proteins is used, and in certain instances excellent tasting hydrolysates with superior qualities are produced, such as when wheat gluten, casein and an extracted soya flour, in proper proportions are hydrolyzed with hydrochloric acid.

We know of one combination of these three proteins which produces an unusually good, dry hydrolysate containing from 16 to 18 percent monosodium glutamate. This product has met with a ready reception from the food industry. Wheat gluten and casein is another combination which in the correct proportions gives a hydrolysate with a high monosodium glutamate content and an excellent flavor.

The protein should not contain appreciable amounts of carbohydrates and fatty materials—if any at all—since these constituents are frequently the source of unpalatable flavors. Appreciable quantities of carbohydrates and fatty subtsances should be substantially eliminated before hydrolysis.

The studies which have been applied to the utilization of protein-containing matter for the manufacture of protein hydrolysates and amino acid flavors have shown that the type of protein and its ratio of amino acid content are fundamental concepts.

Table I gives the approximate glutamic acid content of several natural protein materials.

From this table it can be seen that one of the most acceptable protein materials is wheat gluten. This gluten contains from 80 to 90 percent protein, is fairly adequate with respect to its

Composition and Uses of Commercial Hydrolysates

Table I—GLUTAMIC ACID in Proteins

Protein Material	Approximate Glutamic Acid Content of Proteins, Percent
Wheat gluten	36.0
Corn gluten	24.5
Zein	36.0
Peanut flour	19.5
Cottonseed flour	17.6
Soya bean flour	21.0
Casein	22.0
Rice	24.1
Egg albumin	16.0
Yeast	18.5

Table III—COMMERCIAL Protein Hydrolysate Powder Constituents

Sample	Sodium Chloride Percent	Amino Nitrogen Percent	Moisture Percent	Monosodium Glutamate Percent
1	50.25	5.65	6.25	.....
2	47.04	3.60	16.88	.....
3	58.45	3.16	2.77	2.41
4	56.19	2.50	12.88	.....
5	47.79	4.88	4.77	11.40
6	76.57	1.68	3.62	.....
7	59.66	2.25	4.53	.....
8	65.76	1.97	5.11	.....
9	39.83	4.71	2.15	16.50
10	34.05	5.50	4.00	18.20

Table II—TYPICAL ANALYSIS of a Good Protein Hydrolysate

	Percent
Moisture	2.2
Sodium chloride	39.8
Total nitrogen	6.8
Amino nitrogen	4.7
pH (10% solution)	5.2

Calculated Amino Acid Composition

Amino Acid	As-Is Basis Percent
Arginine	2.0
Histidine	1.0
Lysine	1.4
Tyrosine	1.7
Tryptophane	Trace
Phenylalanine	2.4
Cystine	0.5
Methionine	1.2
Threonine	1.3
Leucine	2.9
Isoleucine	1.7
Valine	1.8
Aspartic acid	4.1
Glutamic acid	12.0

(Equivalent monosodium glutamate 16.03)

Table IV—USES for Protein Hydrolysates in Food Products

Soups	Bread
Stews	Macaroni with meat sauce
Broths	Poultry stuffing and basting
Bouillons	Chow mein
Bouillon cubes	Processed meat
Fish	Hash
Gravies	Meat sauces
Scrapple	Hors d'oeuvre pastes
Sandwich spreads	Cheese spread
Headcheese	Pickle relishes
Mince meat	Baked beans
Sausage meat	Pancake flour
Curing compounds	Cheese rarebits
Goulash	Chili sauce
Biscuits and crackers	Salad dressings
Fruit cake	Mayonnaise
Spice mixtures	Dog foods
Chop suey sauce	

amino acid content, and is high in glutamic acid. Casein, also, is an excellent protein with good glutamic acid content. Soya bean flour and yeast are good proteins. Extracted edible cracklings are a fairly good source, but are not very high in glutamic acid content.

The cost of the protein used for hydrolysis is also important and the proteins named are reasonably priced. The Chinese and Japanese have used many kinds of fish and fish waste. These materials have been utilized very little in this country, for several reasons. One is the difficulty, even with hydrolysis, of eliminating the undesirable fish odor which seems to carry over into the finished hydrolysate.

Carbohydrate Problem

Raw protein material containing large amounts of carbohydrates often produces bitter tasting flavors. Fatty materials present during the hydrolytic process affect the taste and keeping qualities of the hydrolysate, because of oxidation and rancidity development. Since hydrochloric acid is usually the hydrolyzing agent for food hydrolysates, the sodium chloride content of the final product is appreciable, as a result of the neutralization of excess acid with soda. Therefore, only enough acid to give a slight excess for hydrolysis is needed.

The salt content in a good hydrolysate powder should be 35 to 40 percent, and in a good liquid hydrolysate 12 to 18 percent. However, most of the products now on the market in the dry form contain 45 to 55 percent salt and in the liquid form 20 to 25 percent.

Commercial production of satisfactory hydrolysates is dependent upon other factors also, such as elimination of toxic metals and metallic contamination. This requires, among other things, completely corrosion-resistant equipment. Recent trace metal research has definitely indicated flavor aberration, deterioration and destruction due to the trace amounts of metals acting as catalysts.

In drying liquid hydrolysates, many variables must be considered: Temperature, time, type of drying and cooling. Temperature and time, particularly, are important during the hydrolysis period. Too long hydrolysis time and too high temperature often result in objectionable, unpalatable products. Likewise, fermentation, decolorization and neutralization of excess acid after hydrolysis are all important procedures to consider in production of acceptable hydrolysates.

Probably one of the most difficult production problems is making a protein hydrolysate powder with only slight hygroscopic properties. However, there are several hydrolysates, now manufactured and commercially available, excellent in flavor, with high monosodium glutamate content, which are only slightly hygroscopic under normal atmospheric conditions. The scientific use of proper proteins materially lessens the hygroscopicity of the completed hydrolysate powder.

Control points to consider in selecting a good, commercially dry protein hydrolysate are as follows:

1. Moisture should not exceed 5 percent.
2. Range of pH should be 4.8 to 5.4.
3. Sugars should be absent.
4. Taste should be neither scorched nor bitter.
5. The product should be easily soluble in water.
6. Salt content should not be more than 40 percent.
7. Amino nitrogen should not be less than 4 percent.
8. Monosodium glutamate content should not be less than 12 percent.
9. Color should vary from light tan to caramel, provided the other properties are satisfactory.

A comparison of taste with amino nitrogen content shows that the higher the amino nitrogen, the better the taste.

Standards Needed

For proper evaluation of protein hydrolysate for foods, there should be more specific standards than there have been in the past. This would necessitate the manufacture of the best possible products, of constant quality, and having an acceptable minimum monosodium glutamate content.

Numerous formulations of food products have been made using a high quality protein hydrolysate in comparison with monosodium glutamate.

(*Continued on page 202*)

EDITORIALS

COMMENT AND OPINIONS

Ingenious Wage Formula

PROCESSORS in the food industry are likely to feel the effects of the unusual wage formula adopted by General Motors Corp. Although it was proposed by the company and "sold" to the union, the formula is now said to be the goal of the major industrial unions.

Designed to reach the underlying cause of wage unrest—the steadily mounting cost of living—the formula accepts as "normal" the living cost and wage relationship prevailing in the company in 1940. Maintenance of this relationship called for an 8-cent increase in the basic hourly rate of pay. Then General Motors agreed to step up the base pay by 3 cents an hour each year during the period of the agreement.

The 8-cent "cost of living" adjustment is flexible in both directions. Adjustments up or down are to be made each quarter on the basis of the "cost of living index" of the Bureau of Labor Statistics. Downward adjustment is limited to 5 cents in the period of a year, but there is no limit on the markup.

Aside from the question as to the accuracy with which the B.L.S. index measures the cost of living, there is another catch in the "escalator" formula. Will it work when the cost of living index declines? When that time comes, the fair-mindedness of the union will be put to a real test.

The automatic 3-cent annual increase is based on labor productivity. It amounts to about 2 percent per year. This is the average increase in productivity for the economy as a whole, although the increase in manufacturing is about 3 percent per year.

The G.M. arrangement, therefore, is in line with the general conviction that increase in productivity should be shared with labor, even though it is a result of more power and better machines.

This principle of tying wage rates to increase in productivity should help to check price inflation. It also should remove any objection on the part of workers to the installation of high-speed machines.

Everyone in management should closely watch the working of the G.M. formula.

Delivered-Price Muddle

FOOD processors are confused—as are other business men—by the series of court decisions regarding delivered-price systems.

The Supreme Court recently ruled against the multiple-basing-point system in the "cement case." Then the Seventh Circuit Court of Appeals outlawed the use of the same basing point system by 14 manufacturers of rigid conduit. Preceding this by more than three years were two important Supreme Court decisions in the food field. These involved the so-called glucose cases, in which FTC had charged Corn Products Refining Co. and A. E. Staley Mfg. Co. with violation of the Clayton act through the use of a basing-point method of selling corn sirup. The effect of the court action was to ban all single-point basing systems.

Another important case was settled in 1946 by the Seventh Circuit Court of Appeals in Chicago. The court held that the crepe-paper manufacturers were conspiring to eliminate price competition by agreeing to charge virtually identical delivered prices in any one zone.

It seems clear that either concerted or individual use of any type of basing-point formula is ruled out by the FTC Act—as is the use of identical zone systems by two or more companies.

A zone plan is not illegal under the Clayton Act unless the effect "may be substantially to lessen competition among customers." But most zone plans probably do discriminate "substantially" between customers who are very close to each other, but in opposite sides of a zone boundary.

According to Robert E. Freer, Chairman of FTC, the court decisions to date do not necessarily "outlaw all delivered prices or require f.o.b. prices." The legality of any system of freight absorption under the basing point system must be determined in "each individual case." Freight absorption is illegal only if a part of a general price-fixing conspiracy that constitutes "unjust discrimination which injures competition."

Federal Trade Commissioner Lowell B. Mason has remarked that "government will probably first attack the pricing system of those heavy commodities where the freight is a large percentage of the cost of the article to the purchaser." He included wholesale food and grocery products and farm equipment in this category.

There are many ramifications to the problem. So—what to do if your delivered pricing practices fall into one of the classes that the courts have ruled illegal? You can continue until the FTC gets around to you with a cease and desist order. You may attempt to comply with the law as interpreted. Or you can use your influence to get new legislation. Certainly, a clear-cut law would be an advantage, and one which is based on sensible concepts would avoid dislocation of our industrial pattern.

Charles Hoffman

BY the death of Charles Hoffman, of Ward Baking Co., the food industry has lost another of its pioneer food technologists of outstanding achievement. We recall best his study of rope control in bread making. "Rope" is a bacterial infection—a sort of industrial disease—that afflicts many types of food processors. It may occur in dairy products, cucumber pickles, meat pickle and bread, to mention a few.

The causative organism is common and well known, but its sporadic development in food plants formerly caused many a headache and sometimes necessitated costly remedies. Dr. Hoffman originated the procedure of counting the spores of the organisms—*B. mesentericus*—and established a maximum tolerance for numbers of spores in incoming raw materials.

He set up a routine control procedure, and for a time all went well. Then came another unexepected outbreak of rope. As he described it, the ensuing staff conference was an inquisition: Did you test the water, the salt, the flour, the sugar, the shortening, the yeast?

Who ever heard of testing the yeast for bacterial spores? was the rejoinder. "I told you to test *everything!*" When the yeast was examined, it was found to be the source of infection. A great mystery was solved. And to the everlasting credit of the yeast industry, the process was promptly modified at great expense with a view to eliminating this source of infection.

Another, perhaps more spectacular, achievement of Hoffman's was the discovery of mold inhibitors—now widely known as "Mycoban." Since the route by which such a discovery is made is seldom revealed in the patents or scientific literature, the story should be recounted here as an inspiration to younger men. It all started when his discerning eye and questioning mind noted that among the returned stale bread there were some moldy loaves and some that *did not mold!* Why? All were made from the same formula, in the same plant and on the same day. Yet some loaves refused to mold.

Then ensued a long research project in the difficult field of quantitative organic analysis to find out in what way moldy loaves differed from non-molding loaves. It was a research that some food company executives would regard as impractical, visionary and a waste of money. Furthermore, if the answer were found, what of it? But Dr. Hoffman had the confidence of his board, and his laboratory was allowed to persevere until it had proved beyond a doubt that the essential difference between a loaf that withstood molding and one that molded was a small—almost trivial—quantity of propionic acid or one of its derivatives. From that point to the current use of propionate mold inhibitors is another story.

Hoffman and co-workers at Mellon Institute of Industrial Research from 1914 to 1923 also developed "Arkady," a well-known yeast food and bread-dough improver; Florolene, a dry powdered shortening; an unnamed fungal-enzyme converted starch sweetener, and "Vitavim," the latter being a pioneer vitamin-enriched bread.

Dr. Hoffman's methods of thought and prosecution of research may well be emulated by other food technologists.

Progress in Sanitation

EFFORTS to develop sanitary equipment for the confectionery industry are paying off. As a result of the cooperative work between National Confectioners Association and equipment manufacturers, more machines with better sanitary features are coming into the candy plants.

This commendable trend was highly in evidence at the machinery exposition held in connection with the NCA convention. It was seen in the design and construction of machines for easy cleaning, and in the use of materials, such as the chromium steels, which lend themselves to fabrication by welding and which will not develop pits—in contact with acid materials. The confectionery industry is, in fact, taking a leaf from the experience of the dairy industry in respect to sanitary equipment. In the opinion of industry leaders, much remains to be done—yet commendable progress has been made.

But the work on sanitation in the confectionery industry has gone far beyond the design and construction of equipment. The 17 members of the Sanitary Advisory Committee have held meetings on sanitation in their home cities. These meetings have been attended by manufacturers, their staffs and key personnel. Advice on sanitation in confectionery plants has been given by guest speakers from local, state and national governments.

One of the results of these meetings has been the stimulation of interest in the services of NCA's traveling sanitarian. He goes into plants on request, dons his overalls, and puts the finger on bad sanitary practices and situations in and around the plant. This is strictly a service to help the confectioner. The findings and recommendations are confidential.

Why should the candy industry be so concerned with sanitation? Cleanliness in itself is a virtue and the goal of progressive manufacturers. But aside from that, there are dollars-and-cents angles. Product quality is improved, waste is reduced, employee morale is boosted and financial loss and damage to reputation through action of health authorities are avoided. Other food processing industries—even though they see no serious health hazards in their product—should follow the good example of the confectioners.

Tighter Pollution Control

PROGRESSIVE food processors who are discharging their plant wastes into rivers and streams will want to study carefully the Water Pollution Control Act passed during the last days of the 80th Congress. The law is the first stream-pollution bill to pass both houses of Congress in more than 50 years of agitation and discussion.

The law is a compromise between those who want pollution control left solely to state and local authorities and those who want the federal government to have the power to step in immediately and drastically, if necessary, to stop pollution.

The law can't begin to make itself felt until next year, when the money is voted to support the activity it authorizes. But in the meantime food processors should:

1. Make sure that the company's practices are in accord with anything that might come up under the law; or

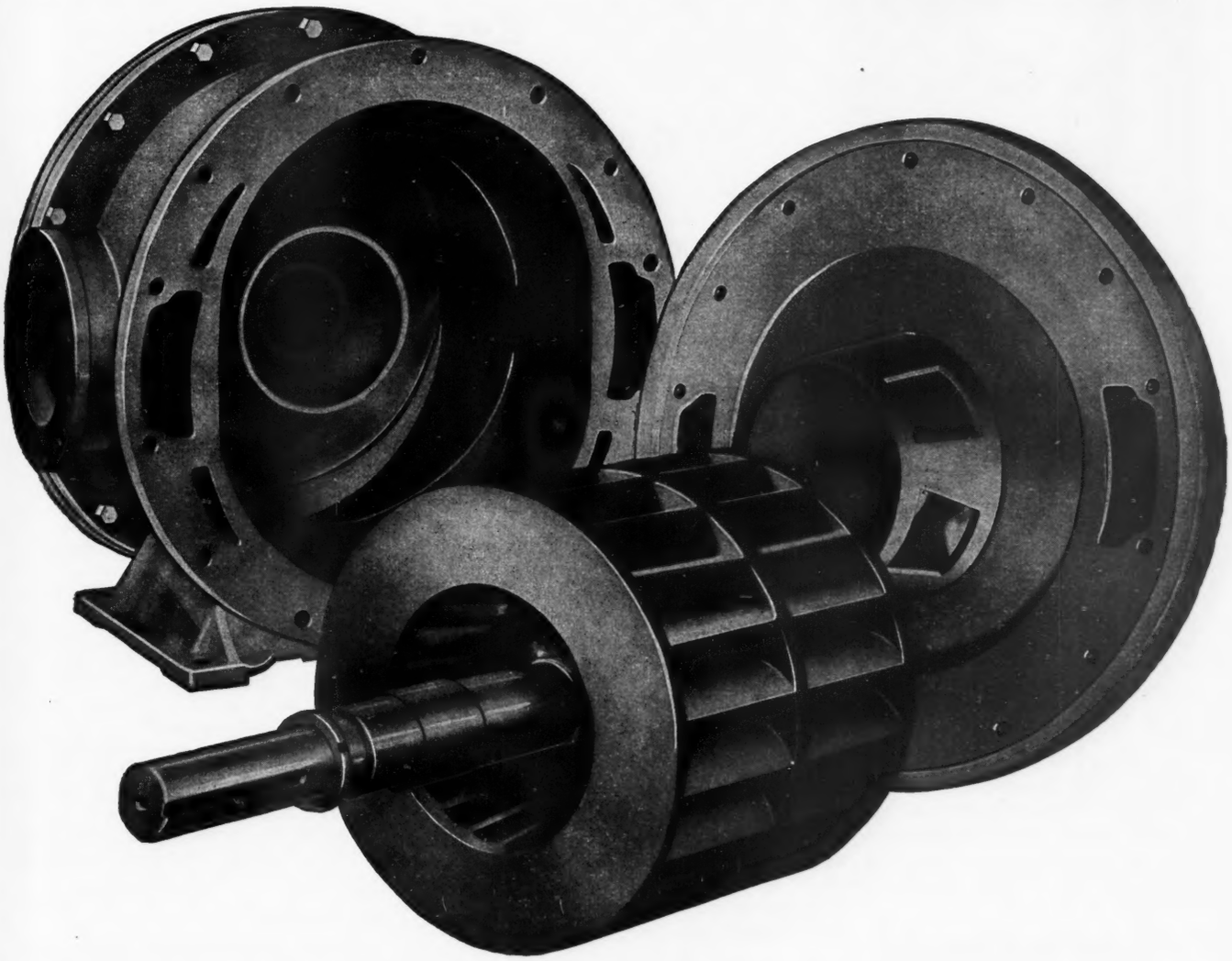
2. If the company is a possible offender, make sure that it begins now to plan what it will have to do to get into line.

The reason for taking the long view now, as expressed by the Senate Committee on Public Works, is this:

"Unless cooperative measures, and what the committee deems to be very reasonable enforcement procedures provided for in the bill, bring about the recognized needed results, it is reasonable to anticipate that a later Congress will enact very much more stringent enforcement legislation."

The food industry's first point of contact, of course, should be the local, state, or interstate pollution agency that has jurisdiction where the plant is located. In all cases, the U. S. Public Health Service—the federal enforcement agency—is required to work through the local agency first.

Only *Nash Vacuum Pumps* have all of these advantages



Nash Vacuum Pumps are simple, having but one moving part. These pumps have unusual characteristics. They will handle a gas and a liquid simultaneously. Slugs of liquid entering a Nash Vacuum Pump do no harm. Thousands are rendering service where this condition is present.

A unique feature of Nash Vacuum Pumps is that, in handling hot and saturated vapors, they have a condensing effect . . . The operating principle involves an internal liquid seal, which condenses and contracts hot vapors and gases . . . Unless the amount of hot vapor is great, other condensing devices are not necessary.

This liquid seal may be varied with the gas being pumped. On solvent work the percentage of recovery may be increased by using a suitable liquid as the pump seal and recirculating this liquid. Because of the complete lack of internal lubrication, the solvent cannot become contaminated.

Nash Vacuum Pumps are furnished in a wide range of capacities up to 5,000 cubic feet per minute. In single stage design they efficiently maintain vacuums up to 27 inches of mercury, and in two stage design vacuums above 29 inches.

THE NASH ENGINEERING COMPANY

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CONVENTION REPORTS

Led by President Gott . . .

Confectioners Consider Key Issues

Q & A Forum Highlights Meeting

Economic and technical problems are thrashed out in morning and evening sessions at annual gathering of candy manufacturers . . . Equipment exposition draws plant engineers and those who man the production lines

PROBLEMS ranging from the price of peanuts to the current difficulty of trying to wrap a 1 or 2 oz. bar on machines designed for 4 and 5 oz. bars were aired by the manufacturing confectioners, at the 65th annual convention of the National Confectioners' Assn., held in New York City late in June.

Morning and evening sessions, under the general direction of Association President Philip P. Gott, were supplemented by the 22nd confectionery industries exposition, which took up two floors of New York's Grand Central Palace.

Too Much Support

Peanuts gained attention at the meeting's first session when NCA's efforts to have them removed from the list of basic commodities was explained by William Fette, Jr., Schutter Candy Div., Universal Match Corp. With the basic commodities supported at 90 percent of parity, it means, said Mr. Fette, that under 1947 conditions, 40 acres of wheat would bring $1,420; 40 acres of corn, $1,650; 40 acres of cotton, $2,150; and 40 acres of peanuts, $2,821. The speaker was confident that this support situation would be improved in forthcoming legislation.

Alarm over the action of the State of Connecticut in putting an embargo on one confection for slack packaging was expressed by Robert H. W. Welch, of James O. Welch Co., chairman of NCS's Washington committee. He said the situation is being studied with the Federal Trade Commission and other government agencies. The industry, however, must strive to understand FTC's policies and make every effort to correct the present inadequate packaging methods, particularly in the case of bars.

More than 125 questions were directed at the production forum, presided over by W. Tresper Clarke, chief chemist, Rockwood, Inc., and James A. King, technical director, Nulomoline Co., who acted as moderator. Following are some of the more significant questions which were posed, together with their answers:

1. What equipment is best used to make a fondant for starch cast creams—an open type heater, a continuous worm heater, or a dough mixer?

A. An open type heater makes a good fondant, but the method is slow and consequently costly. The continuous worm heater makes as good fondant and will use a high percentage of corn sirup, thus lowering the cost. Dough mixers are generally satisfactory, but they produce fondants of coarser texture.

2. What causes chocolate dipped cherries to sink on the bottom?

A. The bottom is too thin and evaporation has taken place.

3. How do you prepare and moisten unsweetened shredded coconut?

A. Formula: 34 lb. of coconut, 56 lb. of water, 6 lb. of invert sirup .

4. What percent of moisture should molding starch have before casting white marshmallows?

A. 6 to 8 percent moisture.

5. How do you keep lozenges from drying up?

A. Pack in vacuum tins or glass stoppered jars.

6. To produce quality cream centers, what temperature should be used, and how long should they remain in starch before coating? Is it better to use a bob or a straight melt-down cream?

A. A bob is best. Casting temperatures vary, average being 138 to 140 deg. F.—or if centers are acid, 145 to 150 deg. Length of time centers should remain in starch depends on type cream. If straight cream, cast it at 138 deg., and leave overnight. If acid, leave in starch only 2 hr.

7. Is there any substitute for the use of carbon black?

A. Activated carbon suspended in glycerine can be used. This mixture is put through a colloid mill to give a black color.

8. How can you prevent lumping when using reconstituted powdered milk in a formula?

A. Thoroughly mix all materials before cooking.

9. Can you test gelatin by any method other than by bloom?

A. Yes, by elastic test, elastic recovery, yield point and gel factor.

10. How do you get a good high gloss on enrobed goods?

A. Temperatures suggested: Enrobing room 84 deg., dipping range 88 to 90 deg., and cooling tunnels 40 below finishing belt, with packing end 52 to 58 deg., depending on tunnel length, and packaging room 64 deg.

11. What makes cast marshmallow sweaty and tough?

A. This condition is directly dependent on type of gelatin used. A low-bloom

gelatin will always sweat and toughen.

12. What makes jellies and gums blister after crystallizing?

A. There are many factors that can cause this condition. Moisture left on surface of pieces, pH of centers and crystal sirup, starch not thoroughly removed from centers, and incomplete drying of jellies. A light coat of gum arabic of sugar sirup may help this condition.

13. What causes the formation of skin on cast marshmallow in starch?

A. The amount of gelatin used, condition of starch, too much water, or starch may not be cool enough.

14. What is the proportion of bob and fondant ordinarily used?

A. Depends on condition of fondant. If right out of heater, only use about 20 percent of bob sirup; if fresh, use small amount of bob; if older fondant, use more bob.

15. Is there any way of shining hard panned goods other than with carnauba wax?

A. Yes, bees wax can be used. Also edible shellac (not exceeding 4.10 of 1 percent F&DA regulation).

16. What are some factors that make fondant whiter?

A. Use of large grained sugars and fast cooking and cooling times. Tanric acid in some mint oils often causes darkening. Of course, general rule is, higher the cook, the darker the color of fondant.

17. What are the secrets of making cast grained marshmallow peanuts?

A. The drying temperature should be about 110 deg. and moisture content should not exceed 6 deg. Marshmallow goods should stand several hours before placing in drying room. Glycerine and invert sugar should be used to keep grained marshmallows soft.

18. What are the best methods of using up hard candy scrap?

A. Some can be used in black gum work. If melted and strained, a portion can be used in cheap hard candy centers. When using scrap, try to keep acid scrap separate from non-acid batches.

19. Other than mineral oil, what can be used to shine soft pan goods?

A. Coconut oil.

In connection with fondant, H. H. Hall, USDA, stated, at another session, that powdered dairy products are beneficial in retaining moisture when used in fondant. Research has shown, he said, that whole milk, nonfat, and buttermilk solids are the powders that give best results, both in moisture retention and flavor.

Sanitation Program

William F. Scully, Williamson Candy Co., was able to report 150 plant visits and 18 meetings as a result of the work of the association's sanitation program. He reported the recommendation of a $50 fee for the services of Gerald S. Doolin, NCA sanitation director. Mr. Doolin comes into the plant as a practical, working sanitarian in response to requests made through NCA headquarters in Chicago.

A plea for greatly expanded activities in research on candies was made by John Henry, Dewitt P. Henry Co., chairman of the NCA research committee. At present, Mr. Henry said, NCA's research work is limited both by a lack of funds and because the association has no laboratory or single director of research.

AACT ORGANIZED

The American Assn. of Candy Technologists held its organization meeting during the NCA convention, naming the following officers: Simon O. Schnitzer, Leaf Brands, Chicago, was elected president; Velt Stafford, Chase Candy Co., St. Louis, 1st vice-president; R. G. Haley, Brown & Haley, Tacoma, Wash., 2nd vice-president; and Hans F. Dresel, Fulton Chemical Co., Philadelphia, secretary-treasurer.

Proposed was an Association award, to be known as the Dr. Stroud Jordan Medal, for the individual making the best technical contribution to the industry. This suggestion was turned over to a committee for full consideration.

Research Progress

Research problems solicited from NCA members included: 1. Loss of flavor and fading of colors. 2. "Stickiness" of hard candy. 3. Ingredient standardization. 4. Fat rancidity. 5. Reducing of setting time of starch jelly gums. 6. Standardization of viscosities of chocolate coatings. 7. Increasing shelf-life of goods—particularly chocolate coated goods.

Studies now being done on candy at the Southern Regional Laboratory, New Orleans, were described by Dr. L. F. Martin. As an example, he pointed to the introduction of 5 to 6 percent soya proteins into hard candies. Other cases involved nougats and hand rolled fruit creams enriched with nonfat milk solids, dry yeast and bone flour. He said the laboratory hopes to get into research on the physio-chemical properties of candy ingredients.

A technical department for the association was recommended by James A. King in the name of the research advisory committee. A field of activity for the director of such a department was also proposed, and included: 1. Coordination of research at Southern Regional Lab., QMC, and various industrial centers, 2. cooperation with American Standards Association, 3. preparation of technical bulletins and binders and 4. contact with colleges doing specialized candy work.

New equipment and new metals for established pieces of equipment were featured at the exhibit, largest in the history of these meetings. Among them was a showing of the first commercial use of Rosslyn metal, a clad-metal made by bonding stainless steel and copper and used in a kettle made by the Savage Bros. Co., Chicago.

Other stainless steel equipment included a viscolizer, pumps, fittings and valves, exhibited by Cherry Burrell Corp., Chicago. Also, an aluminum ingredient carrier for handling storage and processing materials was shown by Aluminum Cooking Utensil Co., New Kensington, Pa.

Brown Instrument Co., Philadelphia, had on display a fully automatic control system for the tempering of chocolate. Polished-aluminum fondant machines were exhibited by Confection Machines Sales Co., Chicago, while American Machine & Foundry included a variable speed planetary mixer with push button control.

Another mixer, shown by Bramley Machinery Corp., New York City, incorporated blades turning at different speeds to provide positive mixing dispersion action.

General Mills, Inc., Minneapolis, had a machine that automatically sets up open-top double-wall trays, or cartons, from die cut blanks. Another push button control operation was the Mogul machine, of all steel construction, exhibited by J. W. Greer Co., Cambridge, Mass. And an improved machine for wrapping fragile regular or irregular shaped products was shown by Lynch Corp., Toledo.

Re-Elect Officers

Major officers re-elected at the meeting were: Philip P. Gott, President of the association, Irvin C. Shaffer, Just Born, Inc., New York, vice president: W. Melville Cribbs, Melville Confections Inc., Chicago, Ill. vice president; and Arthur L. Stang, Shotwell Mfg. Co., Chicago, Secretary-Treasurer.

At this meeting newly elected directors and those re-elected for another term were announced. Newly elected directors include: Harry R. Chapman, New England Conf. Co., Cambridge, Mass., representing the New England Area; Charles R. Adelson, Delson Candy Co., New York, New York Area; R. Lawton Henderson, Norris, Inc., Atlanta, Ga. South-Eastern Area; Wm. Fette, Jr., Schutter Candy Division, Universal Match Corp., Chicago, Ill., Central-Western Area; Elmer C. Muggenberg, Fischer Nut & Choc. Co., St. Paul, Minn., representing the Mid-Western Area; Porter King, King Candy Co., Ft. Worth, Texas, South-Central Area; W. W. Cassidy, Sweet Candy Co., Salt Lake City, Utah, Rocky Mountain Area; and Cecil H. McKinstry, Imperial Candy Co., Seattle, Wash. Northwest Area.

NEW PACKAGES & PRODUCTS

Laminated Cellulose Acetate Labels

CANNED, ready-to-serve products by C. A. Swanson & Sons, Omaha, are being introduced in various sizes of containers with newly designed labels.

Featuring the name "Swanson" and the trademark character "Penny the Hen", the new labels are of bright red, blue and yellow design on white paper stock laminated to du Pont cellulose acetate.

This is reported to be the first time that a food product has carried such a laminated label, hence the development has attracted attention. The process gives a shiny, sparkling effect to enhance shelf appeal and sales stimulus.

Over a year ago the firm retained Eugene Ross, New York designer, to carry out a complete redesign of all consumer packages, and thorough trade surveys were made to measure factors of buying and merchandising of canned goods. Extensive consumer checks were also made to determine the customer reaction to color and design of package.

MPF in Two New Forms

THE CONCENTRATED, fortified, soybean derivative—Multipurpose Food—developed in 1944 at California Institute of Technology, is now being produced in two bland forms particularly suited for use by children.

MPF is composed of soy grits, onion powder, protein derivative, food yeasts, salt, herbs and spices. It is fortified with calcium pyrophosphate, distilled vitamin A, irradiated ergosterol, vitamin B_1, riboflavin and niacinamide. First of the new formulas, MPF-B, contains all the ingredients of MPF except the seasonings. The other, MPF-C, is similarly bland, but contains 25 percent non-fat dried milk solids in addition to the other ingredients.

The food may be used in a number of ways. Easily prepared for eating alone by cooking in water for ten minutes, it may also be added to soups, as additional nourishment; to stews, casseroles, patties and meat loaf as a food extender; or to poultry as stuffing. The two new products may be used as baby foods or for mixing with desserts.

Gentry, Inc., Los Angeles, manufactures the food for a non-profit corporation, Meals for Millions Foundation. The Foundation makes the food available at cost in an effort to supplement the inadequate diets of countries suffering from food shortages.

Canned Seaburger

A FISH CAKE called a Seaburger is the latest addition in the canned sea food specialty field. Made of selected fish, crackermeal, pimientos, onions and seasoning, the cakes are packed and distributed by Alver Sales Corp., New Orleans.

Each can contains twelve cakes separated by parchment paper for consumer convenience. Additional seasoning, or other preparation such as handmolding of the cakes, is not required. Before serving, cakes may be browned on a hot grill, or dipped into a mixture of egg and milk, rolled in bread crumbs or flour and then fried in deep fat.

Distribution is presently limited to the New Orleans vicinity, but wider sales are being planned.

Quaker Wheat Flakes

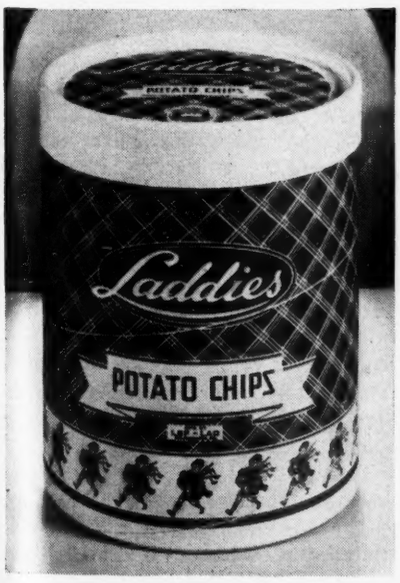
NEWLY DEVELOPED in the ready-to-eat field are Quaker Wheat Flakes, being launched by the Quaker Oats Co. of Canada, Ltd. The product features a bright, attractive package, and within it are included four colorful transfer designs. Among the latter will be sports, birds and animal pictures, canister labels and decorative designs.

Handy Counter Display Aids Candy Sales

FOUR ¼-lb. bags of peppermint, spearmint, wintergreen and cinnamon candy make up the attractive counter-display item developed by Sylvania Division, American Viscose Corp., New York City. The package was originally designed for manufacturers to adapt to their special sales requirements. It accents sales appeal, offering the customer a variety of spice candies.

The bags are of moisture-proof, heat-sealing Sylvania cellophane and they are machine wrapped.

The cardboard shelf-container is painted an eye-catching green, contrasting with the colored tops of individual bags and the different candy colors. This shelf container is sturdily constructed and can be used in the home as an attractive spice rack.



Protected Potato Chips

PLASTIC-COATED, cylindrical, paperboard containers to merchandise potato chips are recent developments of Sealright Co., Inc., Fulton, N. Y. Rigid construction of the package affords protection against crumpling. The inside coating of non-absorbent plastic protects against moisture, keeping the chips crisp.

Lef-Lad Co., Wilkesbarre, Pa., is one of the first to use the new container. The design features the company's characteristic red, white and blue plaid pattern with the trade name "Laddies".

Market-tests are reported to have shown the package to be easily handled, excellent for shelf or island display and quickly recognizable.

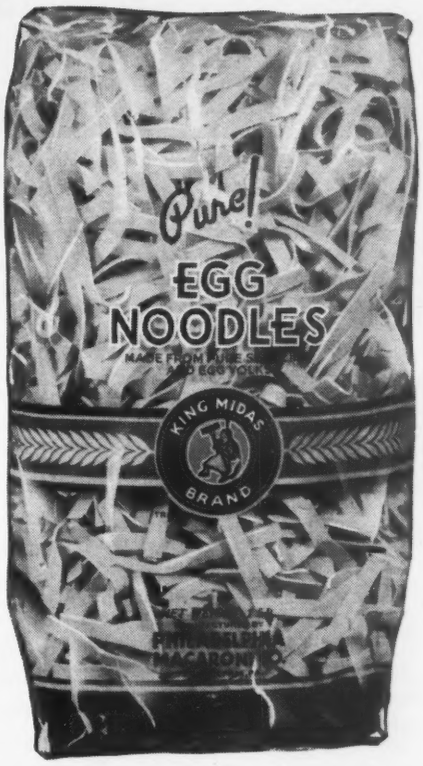
Frozen Delicacies

PRODUCED by Herrick Foods, Inc., New York City. Fantail Frozen Foods now include waffles, hors d'oeuvres, and ice cream filled chocolate eclairs. All products are made under the supervision and according to recipes of the creator, Miss Francis Herrick, who is a home economist with experience as restaurateur, food writer and editor. Pure fresh ingredients help to give these delicacies a home made taste.

The waffles are packaged quick-frozen, six to a box, ready to be placed in a toaster for a minute of heating. The hors d'oeuvres include an attractive assortment of balls and canapes made from cheese, fish, and chicken.

PHILADELPHIA MACARONI CO.

ANOTHER SATISFIED USER OF Paksure FOOD PACKAGINGS



Yes. Philadelphia Macaroni Co., well-known producer of macaroni products, is another satisfied user of our Paksure food packagings.

We are equipped to design and supply a complete line of packagings for all types of foods . . . from noodles to cheese, from meats to chocolates . . . wrappings, bags, envelopes and boxes, etc. of stock or original design for sure protection and "eye appeal".

For packagings that assure maximum protection, utility and sales appeal, consult "experts of long standing" . . . we'll give your problem prompt attention.

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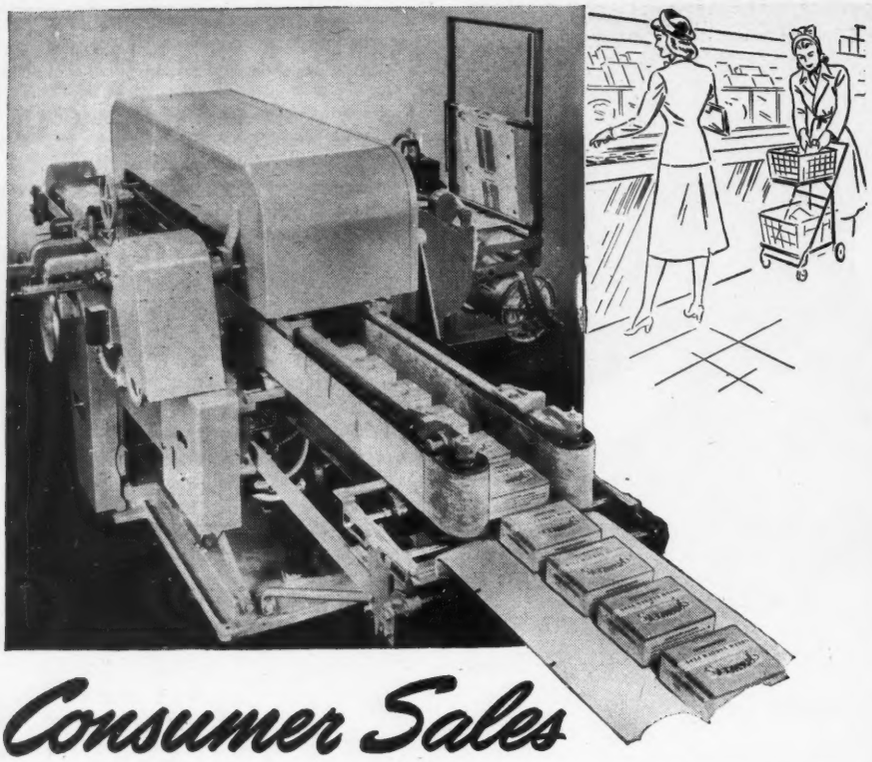

Consumer Sales Start HERE

Packaging—the last step in production—is the first step in sales. Dealers give a smart-looking, eye-catching package preferred positions in their stores. Shoppers are attracted by such a package ... choose it in preference to competing items. Sales come easier. Selling costs go down.

Machine wrapping offers the widest scope in package improvement. There are, today, so many attractive and product-protecting wrapping materials available. And they all lend themselves to beautiful color printing.

Our machines are adaptable to virtually all wrapping materials, and are suited to the requirements of a great variety of products. This, plus their modern, cost-saving features, has made them the most widely-used wrapping machines in the packaged goods field.

Why not check with us to see if your present package can be improved, or your costs reduced?

Write for our booklet "Sales Winning Packages"

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SEATTLE TORONTO

A quick heating for about ten minutes make them piping hot for serving. The eclairs are packed three to a box.

Packages are of the transparent window type to give a clear view of contents.

Sauce has New Look

RETURNING to the U. S. market after a war-time absence, H. P. Sauce is now attractively cloaked in a new label with blue and red lettering against a light green background. Made by H. P. Sauce, Ltd., Birmingham, England, the "Houses of Parliament" sauce comprises a blend of fruits, spices and malt vinegar, according to the firm's special formula. Lea & Perrins, New York is importer and distributor for U. S.

Custard for Restaurants

ANHYDRATED custard dessert, called Tril, is being introduced to the restaurant trade by the Mainland Corp., New York City. Produced from a combination of fresh milk, eggs and shortenings, the powdered mix has a rich golden color.

The dessert is prepared by adding three quarts of water to the contents of the 1½-lb. package (a re-closable, friction-top cannister) and bringing to a boil. Reported to dissolve easily in water without lumping, the material contains no starch and does not become too thick if over-heated or too soft if under-cooked. The product is basic and can be used as the foundation for various flavored custards or puddings. Approximately 30 dessert dishes of 4-oz. capacity can be made from each batch.

Arkansas Rice

HOME-GROWN rice is now being packaged in pound packages by the Junior Chamber of Commerce at Stuttgart, Ark. The box is colorfully illustrated, with red, blue and yellow against a white background. It has a round transparent window to view the contents. The various trade names of rices produced in the city's area are printed on the sides.

Offers Grenadine Sirup

NOW BEING PRODUCED and bottled under special formula for the Angostura-Wupperman Corp. is a new grenadine sirup bearing the AW brand. The product is prepared under the same high standards as the company's well known Angostura aromatic bitters, distributed since 1871.

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All you do is apply the cleaner as directed; then rinse away loosened residues. Oakite cleaners emulsify the fats, wet and penetrate vegetable, fruit residues. Others dissolve lime-scale; remove stains. These soils are then suspended in the cleaning solution for easy rinse-away. Carefully compounded alkaline and acidic cleaners simplify jobs like . . .

DESCALING BLANCHERS: With Oakite Compound No. 32 you easily soak loose even tenacious lime-scale. This inhibited, acid Oakite descalant quickly disintegrates bacteria-holding deposits, but does not harm metal. Applied as directed, it is far safer to use than raw commercial acids. Now take a job like . . .

CLEANING KETTLES, VATS, TANKS: Meat residues and fatty deposits drop off in a hurry when Oakite Composition No. 63 goes to work. It emulsifies greases; penetrates and loosens soils for easy removal. Leaves no white residues on equipment. And take a job like . . .

REMOVING STAIN FROM BUCKET CONVEYORS: That's a cinch when you use built-for-the-job Oakite Compound No. 84M. This mildly acidic detergent quickly lifts off fruit and vegetable stains. Does not attack base metal.

WHETHER YOU HAVE to remove vegetable or fat soils, lime-scale, rust; chemically sterilize, deodorize or rust-proof equipment, Oakite has the compounds to handle the job — economically. For helpful . . .

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FOOD INDUSTRY NEWS

Price Decision Leads to Probe

Senate authorizes investigation into how seriously industry is affected by basing-point decision

USE of delivered prices by food manufacturers—as well as producers of cement and steel—have been put under a heavy legal cloud by the decision of the Supreme Court in the now-famous Cement Institute case.

The uncertainty surrounding the application of the far-reaching decision to specific industries—even the cement industry—has inspired the Senate to vote $50,000 to finance an investigation. They will try to find out how this decision affects big business, small business and the consumer.

Senator Capehart (R., Ind.) sponsored the resolution that called for the investigation. He will have the job of running the show. He was forced, however, by Senator O'Mahoney, longtime anti-monopolist, to broaden the scope of the investigation to include an inquiry into the increase of monopoly and economic concentration.

It is generally conceded that Senator Capehart, as the man in charge, will, if he can, keep the investigation directed to this single point: "What, if anything, can or should be done about the Cement Institute decision?"

If the testimony and evidence bear out what the critics of the decision have been saying about its harmful effects, it is practically certain that remedial legislation will be proposed.

Don't look for quick action, however. Already, there is talk that "it may not be possible to begin hearings before election," and "field hearings may have to be held to get testimony from small business and the consumer."

Justice Dept., FTC Hit Makers of CO_2

SIMULTANEOUSLY, the Federal Trade Commission and the Department of Justice anti-trusters have got together to hit the manufacturers of carbon dioxide with price fixing and monopoly suits.

The companies, according to government figures, manufacture about 75 percent of all the CO_2 sold in this country for soft drink manufacture and for refrigeration of perishable foods.

FTC got in the first punch with a cease-and-desist order to the following companies: Liquid Carbonic Corp.; Air Reduction Co. and its wholly-owned subsidiary, Pure Carbonic, Inc., all of New York City; and Michigan Alkali Div. (formerly Michigan Alkali Co.) of Wyandotte Chemicals Corp.,

Department of Justice then came along with a Sherman Act civil suit against these same companies, adding to the list the International Carbonic Engineering Co., a patent-holding company, incorporated in Delaware.

FTC had a long list of particulars, based on facts stipulated by the defendents. What they amounted to was price-fixing, patent pooling, knocking out of competitors by price wars, allocating markets and customers, and buying out competition.

FTC's order said they could not do these things any more, and gave the companies 60 days to report how they were complying with FTC's order. But that was about as far as FTC could go.

The Department of Justice suit had more concrete objectives — based, though, on the same set of facts. The anti-trusters were after such things as "divestiture of illegally acquired plants" and "compulsory licensing of abused patents."

Northrup Goes to IEFC As Secretary-General

FREDERICK B. NORTHRUP. director of the Price Support and Foreign Supply Branch, PMA, has been appointed secretary-general of the International Emergency Food Committee, according to a recent announcement by Norris E. Dodd, FAO director-general.

Mr. Northrup succeeds Dr. D. A. FitzGerald, who resigned last April to become director of food for the Economic Corporation Administration.

Meat Unions Sign T-H Affidavits

Disavowal of Communism brings resignation of two leaders, one of whom openly admits Red tie

Loss of the meat packing strike, the threat of raids, and AFL and independent union opposition caused the CIO United Packinghouse Workers leaders to abandon its refusal to sign non-Communist affidavits, which would bring it into compliance with the Taft-Hartley law.

As a result, two district directors who refused to sign affidavits, resigned They are Herbert March, Chicago, and Meyer E. Stern, New York. March, in a public statement, admitted he is a Communist.

"I have always disdained to conceal the fact that I am a Communist," March said. "I have always felt that my Communist views strengthen my ability to serve this union and fight for the best interest of our membership."

The U. S. Supreme Court has upheld the legality of the Taft-Hartley requirement that unions register financial and organizational data with the Labor Department before they may use the machinery of the National Labor Relations Board. At the same time, the court declined to rule on the companion provision that non-Communist affidavits must also be filed by union officers. This leaves in effect a lower court decision upholding the Constitutionality of the affidavits.

This action of the Packinghouse workers may very well point the way out of an untenable position to the few remaining defiant unions.

British Information

AFRICAN GROUNDNUTS

Mechanical diggers are at work on first harvest from newly developed groundnut farm in East Africa. With 7,500 acres planted, British Commonwealth authorities will help relieve world shortage of fats through use of these nut crops.

Pickle Packers See Good Year; Quality Up, Favorable Markets

AN ESTIMATED DECREASE of 4 percent in contracted cucumber acreage during 1948 will not appreciably affect the statistical position of pickle packers in the U. S. nor will it impair their favorable market position this year. This was the view at the mid-year meeting of the National Pickle Packers Assn., held June 17 in Chicago.

President Harry L. Conley, Green Bay Foods, Green Bay, Wis. described the downward trend in contracted field acreage as having its basis in the exceedingly high carryover of raw stock this year.

He stated gross supply of raw stock on hand June 1 was 5,106,076 bu. as compared with a total of between 2,500,000–3,000,000 bu. carryover on June 1, 1947. Consumption in the past eight months totaled 6,300,000 bu., or approximately 780,000 bu. per month.

Anticipated contracted acreage in 1948 is expected to run between 133,000–140,000 acres, according to a preliminary statistical report read by Col. E. T. Miller, secretary of the association.

Improvements in the quality of pickle products since 1940 have come largely through industry-sponsored research in production methods and from studies concerning disease-resistant varieties. This was emphasized in a research report by F. W. Fabian, Research Professor of Bacteriology, Michigan State College, East Lansing, Mich.

Yearly sanitary analyses of pickle products made under the industry's quality improvement program indicate that: (1) An improved raw product is being grown, (2) product contamination has been substantially reduced, and (3) packers are giving closer attention to proper salting and finishing operations.

Improve Taste!

Dr. Fabian recommended that sanitary analyses of the yearly pickle crop be continued and that improvements be made by packers in the taste properties of dill products.

An allocation of $12,000 has been made by the association in support of research projects during 1948 to include product improvement and seed studies. Besides the project in quality control at Michigan State College, a study in production comparisons of cucumber seed varieties is nearing completion at the U. S. Agricultural Experiment Station, Raleigh, N. C., under Dr. John L. Etchells, bacteriologist, USDA.

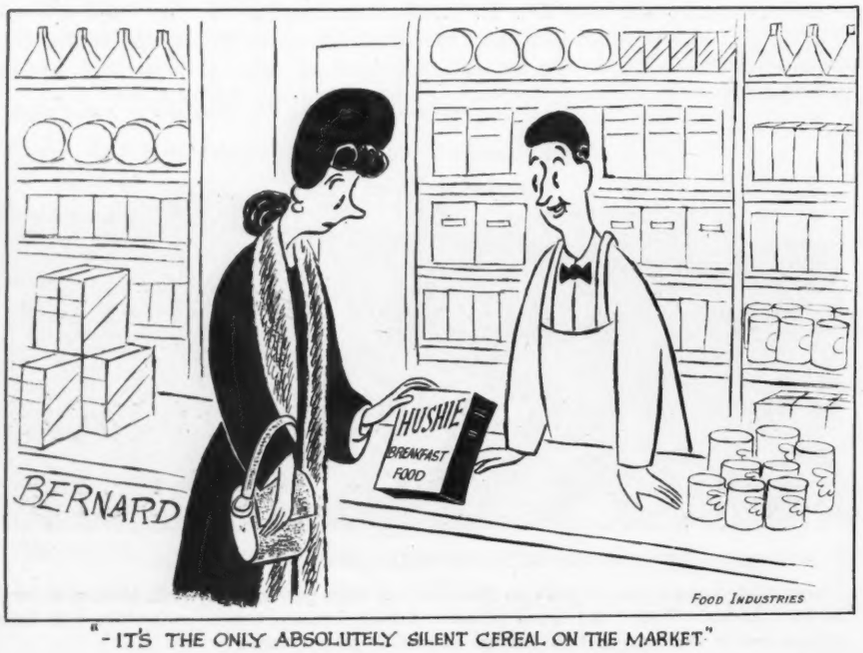
Preliminary results have been summarized in a 74-page folder that describes better yield varieties, disease resistant types of cucumber seeds, uniformity and environment factors and good shipping qualities of raw stock.

An electronic sorter for grading pickle stock mechanically according to length and diameter was described by Jack M. Roehm of Buehler & Co., Chicago development engineering firm. He demonstrated an experimental model.

Two sorters have been designed by the company, one having a capacity of 500 bu. daily and a larger type which can grade and sort 1000 bu. per day. Each machine has two units: (1) An electronic element which contains solenoid switches and transmits power to an "electric-eye" component on the mechanical sorter, and (2) the mechanical sorter, which has a conveyor unit equipped with sorting stations under the electronic projectors' control to sort the pickle stock in uniform sizes.

Cost of each machine is determined by its sorting capacity during an 8-hr. day. Sorting costs are expected to be reduced by 50 percent in comparison with manual sorting, and improved quality of finished pickles is seen obtained.

Experimental development work on the sorter was done by the Buehler firm following approval and sponsorship of the project at the mid-year meeting of the association in 1947. A production model can be available within a year for testing on a commercial basis, subject to further sponsorship.



"- IT'S THE ONLY ABSOLUTELY SILENT CEREAL ON THE MARKET"

Off Season Not Time For Union Shop Vote

UNION SHOP elections in the food processing industry will not be conducted by the National Labor Relations Board during seasonal low-employment periods.

This significant policy was announced unanimously by NLRB in a decision involving McKeon Canning Co., Inc., Burbank, Cal., which processes corn into hominy during the winter and cans tomatoes in late summer and fall. On the same day, the board promptly applied this principle in a similar situation involving Winckler & Smith Citrus Products Co., Los Angeles, which cans citurus juices.

In both cases, Local 630 of the AFL Fruit & Produce Drivers, affiliated with the Teamsters, petitioned NLRB to conduct Taft-Hartley law elections among the employees of each company on whether they wished to authorize the union to seek a union shop from the employers. Approval by a majority of the employees affected is necessary before a union shop can be enforced.

At the time of the petition, McKeon had 40 employees and Winckler & Smith 10 employees, representing the number employed on a year-round basis. In the peak fall season, McKeon employs 375 and Winckler & Smith about 100.

NLRB denied the holding of union-shop polls at this time. It directed, instead, that they be held "when the number of employees becomes representative of the total number employed during the usual peak employment period."

The board said: "An election at this

time would permit the small group of employees now employed to bind the much larger group, who will work during the peak canning period. This would be inconsistent with the spirit and intent of the (Taft-Hartley) statutory provision for union-shop authorization elections, *vis,* that a majority of those to be bound by a union-security agreement should authorize its negotiation."

Lack of Funds Kills Food-Saving Agency

LAST SIGNS of the Luckman food conservation drive disappeared June 30, when the Office of Food & Feed Conservation of the Department of Agriculture died for lack of funds.

The OFFC was included in the departmental budget requests for fiscal 1949, but it never got past the Bureau of the Budget. The bureau, which wields the power of the President on such points, refused to allow a request for funds to be taken to the Congress.

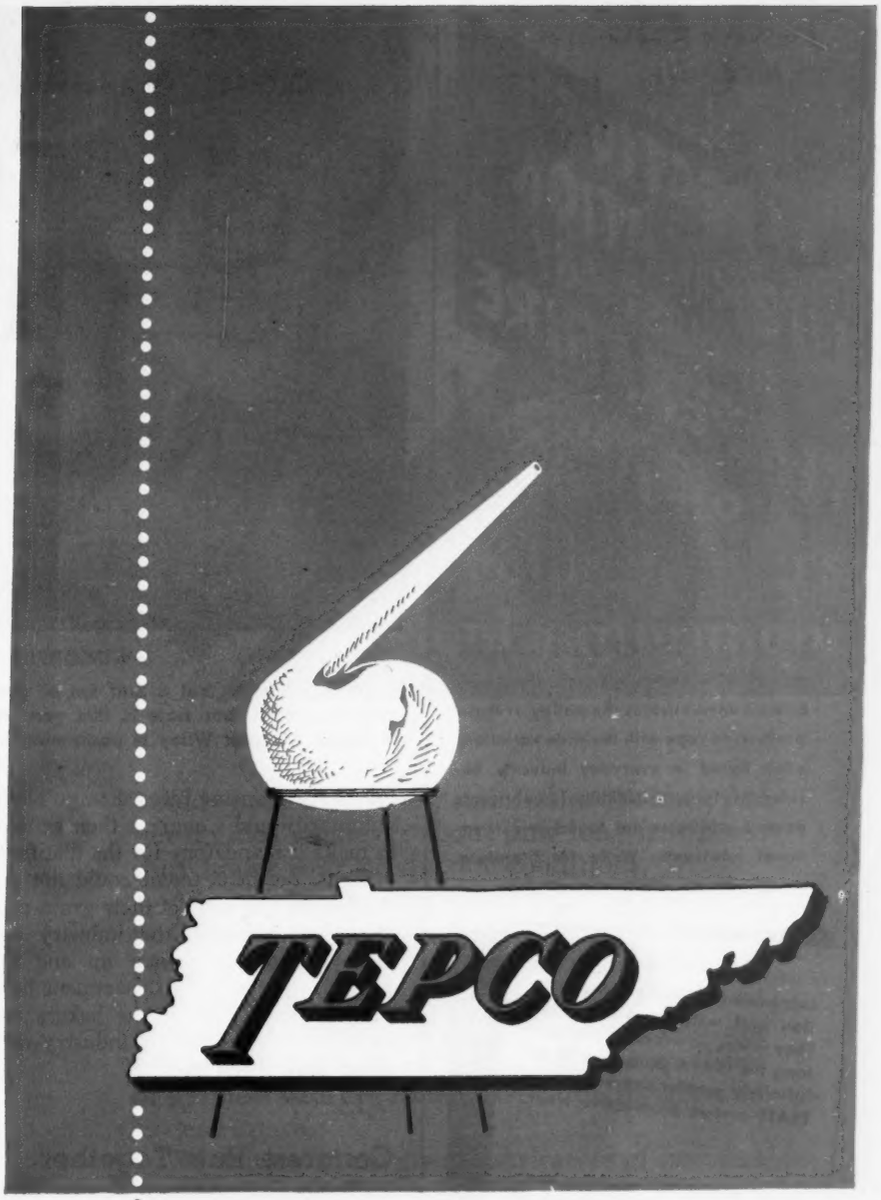
The OFFC had, in the last few months, put a reverse twist on its job. Instead of admonishing people to eat less scarce foods, it propagandized for greater consumption of more plentiful foods.

As part of this campaign it tried out its "Banner Foods" campaign in the test cities of York and Lancaster, Pa. According to the department, good cooperation was received from the local merchants, and there were upped sales of plentiful foods for the cooperating food stores. Among these foods were citrus fruits and juices, both fresh and canned; canned peas, fresh produce of all kinds, dried fruits, and processed tomato products.

Just before the program was polished off, the Bureau of Agricultural Economics began surveying the results of the campaign in the two test cities by interviewing housewives and food merchants. BAE hoped to learn what can be accomplished by using a government label as a promotional device to sell plentiful foods—and how such a program could be done better. Analysis of this sort might be useful at some later date, either for the government or for private industry groups which may consider using the techniques which OFFC tried.

Biggest single splash made by OFFC was the distribution of 3½ million recipe books devoted to menus and recipes making use of foods in good supply.

Most patent failure of the food saving campaign was the voluntary allocation drive, which OFFC directed in the food industries. The whole idea, if it wasn't doomed to failure from the beginning, got its death sentence when



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EFFECTIVE LUBRICATION AT MOST ANY TEMPERATURE
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Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

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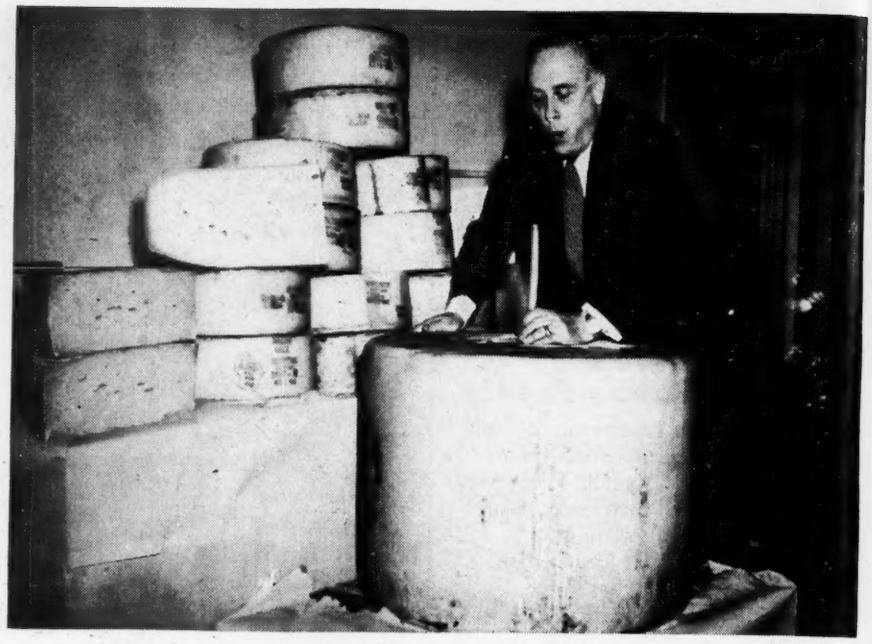

WISCONSIN HAS A BIRTHDAY *Wide World*

Wisconsin figured that a half ton of cheese would be about right amount to impress nation's capital that state is this year celebrating 100th anniversary of its admission to union. Senator Wiley is performing birthday rite.

the liquor industry refused to go along voluntarily and Congress then refused to make it mandatory for the distillers.

Thus, the department could not ask the brewers to restrict their grain consumption, although the industry had such a program drawn up and approved. Nor did the department have much success getting the bakers and millers to agree to an industry-wide grain saving campaign.

Congress Puts Together Two Opposing Farm Bills

THE LEGISLATURE did the impossible: It took two diametrically opposed farm-price support bills, rolled them into one and thereby passed them both. It was able to do this by specifying that one part of the new law go into effect Jan. 1, 1949, and the second part Jan. 1, 1950.

So far as can be remembered, this is one of the few times that Congress ever passed a law to take effect a year and a half after the date of enactment.

Here is how the new price support program shapes up:

Beginning Jan. 1, 1949, the law provides for price supports at 90 percent of parity for the six basic crops: Cotton, wheat, corn, rice, tobacco, and peanuts. Support at 90 percent of parity will also be given the following Steagall commodities: Milk and its products, hogs, chickens and eggs, and Irish potatoes harvested before Jan. 1, 1949.

The other Steagall commodities, which are now supported at 90 percent, must be supported during 1949 at "not less than 60 percent of parity." These are turkeys, soybeans for oil, American Egyptian cotton, sweet potatoes, dry peas and beans, and flaxseed for oil.

This 1949 part of the new law is regarded as a major victory by the long-range planners, in that it did not extend the 90 percent price guarantee to all the Steagall commodities, as many farm Congressmen wanted. Also, it knocked the price support for cotton from 92½ percent (which only cotton has under the present law) down to 90 percent with the other basic commodities.

Beginning Jan. 1, 1950, the new price support law puts into effect the so-called "Aiken bill" formula, which was one section of the comprehensive bill passed by the Senate. The Senate would have reorganized many Department of Agriculture activities as well as changed the price support policy of the government.

This new policy is almost identical with the price support law that was drawn up by the Department of Agriculture, and certainly it is the kind of law which the department hopes will actually go into effect.

Here is what the 1950 part of the new law provides:

Instead of a guaranteed 90 percent support price for certain commodities, it calls for a flexible support pattern, ranging from 60 to 90 percent of parity for all commodities—whether basic or non-basic—largely at the discretion of the Secretary of Agriculture.

A formula is provided that would tie the actual support level for any

commodity to the supply of the commodity on hand. Supports might be at 90 percent, for example, when the supply on hand is only 70 percent of normal; support price might be at 60 percent of parity if the supply is more than 130 percent of normal.

If marketing quotas or acreage allotments for the crop are in effect, then price supports will be increased by 20 percent over what the formula would otherwise call for. But in no case shall the support price, be more than 90 percent of parity.

Two special provisions got into the new bill on the Senate floor before the log-rolling was stopped. One of these requires that tobacco be supported at 90 percent of parity regardless of any other provision of the bill; the other says that after Dec. 31, 1949, potatoes must be supported at 60 to 90 percent of parity.

A so-called modernized parity calculation is adopted to give appropriate recognition to changes in relationships between various commodities occurring since the base period of 1910-14—such as those resulting from the discovery of new uses or new methods of production.

Lowers Parity

Effect of this is to lower the parity figure generally for grains, corn, oats, barley and wheat, and for cotton, peanuts, and rice; and to raise the parity level for hogs, beef cattle, milk, and cottonseed.

This new formula fits in with the USDA ideas of gradually swinging the agriculture economy over from a grain exporting basis to a meat and milk production basis. In short, by raising parity on meat and lowering it on grain, the idea is to feed the grain to the animals, and let the consumer eat the meat. This uses plenty of grain —to keep the midwest happy—and uses plenty of meat and milk to keep the cattle and dairy people happy.

The Southerners and some of the grain growers don't see this, however; they like their 90 percent of parity, for sure, forever, on Southern crops—and the new formula drops the support level for cotton, peanuts and rice, all Southern crops.

What the Southerners and their allies will try to do at the earliest possible moment during the next session is to get up there on the 90 percent level with tobacco.

And they may well do it yet. There is definitely no thought in the minds of Rep. Hope (grain) or the Southern Congressmen of ever having this 1950 part of the law go into effect. It was merely the price they had to pay to get the Senate to go along on any extension.

Looking at a bright new stainless steel vessel, you get no idea whatever about how long it will endure under *your* production conditions.

And yet the way that vessel will "take it" need not be accepted on faith. Go into your fabricator's plant. See if he has all the special equipment and the trained mechanics required to work stainless steel as it *should* be worked; because it's during fabrication that the corrosion resistant qualities of stainless steel are either safeguarded or allowed to deteriorate.

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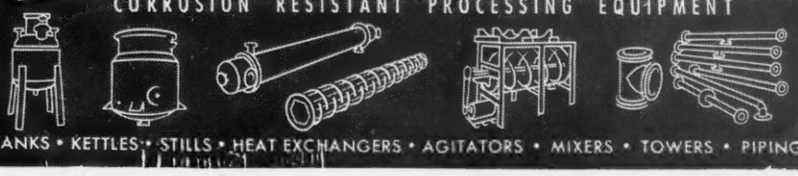

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Sturdy BUFFALO solid-woven cotton belting impregnated with neoprene synthetic or natural latex has a *snap* and wear-resistance that make it the ideal belting for cannery service.

This fine-quality BUFFALO belt is especially designed for conveying vegetables, fruits and other food products where moisture is prevalent. Acids which attack ordinary cotton belting have no destructive effect on BUFFALO Latex Canner's Conveyor Belting.

Other BUFFALO *Latex* features are: 1) No seams to split—no plies to separate 2) Maximum pliability 3) High tensile strength 4) Odorless 5) Low operating cost.

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Other Buffalo Weaving and Belting Company products including: Plastex Belting • RF & C (rubber-covered) Belting • Solid Woven Cotton Belting • Glazed (nitro-cellulose coated) Belting.

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ICC Plans Full Review On Food Trucking Case

WHEN does an agricultural product become "manufactured," and when is it still "unmanufactured?"

Because the answer to that question is so important to the food industries, the Interstate Commerce Commission, at the request of the Department of Agriculture, has decided to open up the whole matter in an investigation that will begin sometime this fall.

The USDA asked ICC to investigate after the commission ruled, in the Harwood case, that truckers who haul fruits and vegetables that have been washed, cleaned and packaged are subject to ICC rules. Such products are "manufactured," according to ICC's view as expressed in the Harwood decision.

Although the investigation will cover agricultural products, it will not cover the usually included fish and shellfish, according to ICC. The question of what fish or seafoods are included in the exemption is being fought out in the courts. In the Monarch egg case, the ICC held that only the whole fish as taken from the water is an exempt product, and that the exemption is lost when any work is done on the fish or shellfish.

The decision was appealed in the federal courts, and the decision of the U. S. District Court at New Orleans over-ruled the ICC. This judgment is now being appealed by ICC. The question is not likely to be settled until the Supreme Court decides, or refuses to hear, the case. In the latter event, the Appellate Court ruling will be decisive.

In the meantime, the farm organizations, trade associations, and interested food processors, as well as the Department of Agriculture, will be preparing testimony for the ICC's investigation. The date on which the hearings begin will be set at the convenience of the USDA, which in turn will be guided by the convenience of the other organizations.

THE PROCESSING PICTURE

Lever Bros. Becomes Producer of Margarine

WITH THE PURCHASE of the John F. Jelke Co., manufacturer of Good Luck magarine, Lever Bros. has paved the way for a major operation in the food field. In discussing the new acquisition, Charles Luckman, Lever Bros. president, made known company plans for the building of new plants on both the east and west coasts to supplement the Jelke Co.'s present margarine output in the mid-west.

Present plans indicate that the newest member of the Lever group will continue, under its own name, as a separate subsidiary of the parent company.

In addition to its margarine production, Jelke also manufactures and distributes a bulk shortening, a mayonnaise, a salad dressing and a sandwich spread, all under the Good Luck trade name.

Vacuum Cap Tie-In Is Voided by Decree

ANOTHER tie-in contract, which required a food packer to buy supplies from one manufacturer as part of the price of being able to lease that same manufacturer's food packing equipment, has been severed by the Department of Justice.

The Department announced a consent decree against White Cap Co., Chicago, manufacturer of vacuum caps for packaging food in glass containers. The Department's complaint, originally handed down in May, 1946, stated that the defendant sold about 85 percent of all such closures used by making the lease of their patented sealing machine contingent upon a packer's buying his caps only from White Cap.

The consent decree signed by the company is in line with similar actions against other equipment manufacturers. In November 1946, for instance, the Owens-Illinois Glass Co. signed a similar decree. And in November 1947, the Supreme Court upheld the Department of Justice in the Morton Salt Co. case, one of the most recent high court decisions in the field of tie-in sales.

Federal Action Launched Against Stream Pollution

A NEW stream pollution law—one whereby the federal government may stop factories from turning their polluting wastes into streams—is now in effect.

While the law has not yet been backed by an appropriation to put it immediately into operation, the U. S. Public Health Service, as enforcement agency, is already organizing and planning its operations for the time when Congress votes the money to put them into business.

The law provides: (1) A method of bringing stream pollution violators into the courts, (2) grants of money

to state and interstate agencies—but not to industry—for construction of pollution abatement facilities, (3) a new federal laboratory to conduct research into water pollution problems.

The powers of enforcement under the new law can be exercised only after a long procedure of notification and hearings is gone through—all of which gives the company involved many chances to work out a method of satisfying the authorities.

Much more important at present than the so-called "teeth" in the new law are the financial and other aids to state anti-pollution agencies, and the research program authorized by the law.

The Public Health Service makes the surveys and recommendations, but the engineering phases of its work are under the control of the Federal Works Agency.

One important feature of the Water Pollution Control Act is the research program authorized. The bill permits $800,000 to be appropriated each year for five years to build and equip research laboratories at Cincinnati, where the Public Health Service laboratories are located.

U. S. Public Health Service already has a plan afoot to open district offices, one for each of the river basin areas. Such an office is already in operation in Kansas City, and others will be put into operation from time to time for the Columbia River, the Upper Mississippi, the Great Lakes, the Ohio River.

USDA Grade Standards

REVISED grade standards in June concerned *canned beets*. In addition, *filberts* in the shell are now covered by the first issuance of grade standards.

Fifth issue of U. S. standards for grades of canned beets included the following rulings: (1) Size variations in whole beets will be determined by diameter rather than weight. (2) Tolerance for length of beet strips in Julienne style has been increased from 10 percent to 25 percent longer than 1½ in. in "U. S. Grade A" and from 25 percent to 40 percent in "U. S. Grade C". (3) Maximum size of diced beets has been increased from 5/16 in. to 3/8 in. for "U. S. Grade A". (4) Tolerances have been clarified under the factor of absence of defects for sliced, quartered, and cut beets. (5) Drained weight recommendations for some of the sizes and styles of canned beets have been changed. (6) The count range for No. 1 picnic size container for whole beets has been changed.

Effective date for the new standards, published in the *Federal Register* on June 9, was set for July 9.

"U. S, No. 1" is the only grade for

What's finer than fine powdered sugar?

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The newest news from National Sugar! Read all about it!

HAVE YOU been wishing for a *finer* powdered sugar than the one you now use?

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Then MICROFINE is what you want! *A sugar so extra fine it will go through a 300-mesh screen!*

MICROFINE is the newest product of The National Sugar Refining Company. (And you know what the name National means when it comes to producing smooth-textured sugars.)

Find out all about this new, finer-than-fine cane sugar. Better yet, try it yourself. Order now. In 100-lb. bags.

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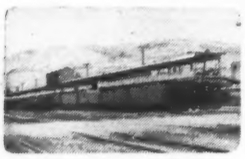
Providing Community Refrigeration Center Services for Utah

Said to be the largest of its kind between the Mississippi and the Pacific Coast, the Utah Ice and Storage Co. has three plants at Salt Lake City and others at Ogden and Provo, plus a sixth at Boulder, Colorado.



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This firm serves the Inter-mountain area as an extended COMMUNITY REFRIGERATION CENTER.

Among the 7,000 Lockers

Among its operations are making 460 tons of ice a day, storing 15,000 tons, and icing many railway cars — 70% of transcontinental freight passes that way. Capacity of its cooler rooms is 300 carloads; its freezer rooms, 350.

Up to 1,500 Tubs of Flowers

Quick-freezer Belt, 6'x65'

Its quick-freezers can handle 100,000 lb. daily. Last year 15,000,000 lb. of meat, poultry, fruit and vegetables were frozen. 7,000 frozen food lockers are now installed. This modern plant stores or freezes practically everything.

Dried Fruit and Nut Storage

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ANY area—including yours—could profit from such complete cooling service. Get full details: ask for Bul. 126.

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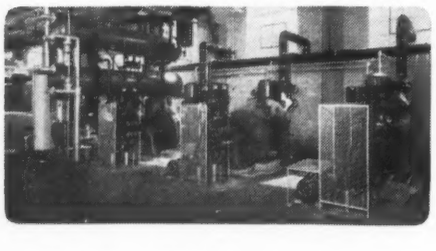
New Plant Makes 100 Tons of Ice Daily



Wide World

HELICOPTER BECOMES SPRAYCOPTER

For first time in Britain crops are being sprayed from a helicopter on a commercial scale. This demonstration over wide field of flax at Cambridge was for benefit of farmers from all parts of country. 'Copter gets closer than conventional duster plane.

filberts in the shell proposed by Production & Marketing Administration in the June 3 *Federal Register*. Specifications for sizes were given as jumbo, large, medium, and small, both for round type varieties and for long type varieties. Tolerances of approximately 10 percent are indicated, within which certain factors must be considered separately. Lots of filberts which have not been classified in accordance with "U. S. Grade No. 1" shall be designated as "unclassified". Definitions applicable to the standards are included.

No written data, views, or arguments had been filed with the Department within the time limit provided, so formal promulgation of the standards will probably see no change from the proposed standards as published.

Bakers in South Hear Bread Standards Talk

HEARINGS to set standards for bread are to be conducted by F&DA in Washington in the fall, Maurice M. Jackson, Chicago, past president of the Chicago Bakers Club, told the 14th annual meeting of the Tristate Bakers Assn. in New Orleans, June 8–9.

Mr. Jackson said that the entire baking industry will follow the approved ingredients for all baking products. The proposed standards suggested in 1941 and 1943 were postponed due to wartime shortages.

The industry was urged to expand its advertising and merchandising policies to tie-in with national programs as a means of holding present volume levels. Cooperation among competitors was urged to further the best interests of the industry.

Ben Pollman, Meridian, Miss., was elected president to succeed Al M. Caldwell, Baton Rouge, La.; J. Roy Smith, Mobile, Ala., was re-elected first vice-president; John Wolf, Baton Rouge, was named second vice-president; and Sidney Baudier, Jr., was re-elected secretary-treasurer.

F&DA Food Standards

COMPLYING with direction of the 9th Circuit Court of Appeals, a hearing was scheduled for July 7 on standards of identity and fill of container for canned oysters. This resulted from a petition filed by Willapoint Oysters, Inc., shortly before the June 11 effective date of the standards. Additional evidence will be taken "as to the petitioner's alleged new method of preparing oysters for canning by blanching fresh shucked oysters and as to the proper standard of fill of container. . . after such preparation".

Notice appearing in the June 23 *Federal Register* set the hearing date one day short of the 30-day period granted by the Court for such action.

Canned shrimp: Final order for standard of fill of container, published in the June 23 *Federal Register,* proposed that no amendment of the 1942 standards be provided for reduction in the requirement for cut-out weight for wet-pack or dry-pack shrimp.

Bromated flour: Final order was expected without change from the tentative order, which appeared on June 10.

Canned green and wax beans: Final order was expected early in July.

Cheeses and salad dressings: Tentative orders on standards of identity will be the next official action on these commodities. No predictions as to dates were possible as of early July.

Frozen fruits: Hearing recessed on June 15 after a little over eight weeks of testimony. Resumption was scheduled for July 15 to consider the use of saccharine as an optional ingredient with certain of the frozen fruits. Quite a lengthy record was made in the course of the hearing, so a tentative order should no tbe expected until fall.

Amendment of the cream cheese standard has been requested. A formal hearing to consider the amendment will probably be held in early August.

Bakery Course Called Off

CANCELLATION of its course in bakery sanitation, scheduled for New Orleans, in November this year, was announced by the Sanitation Department of the American Institute of Baking, Chicago.

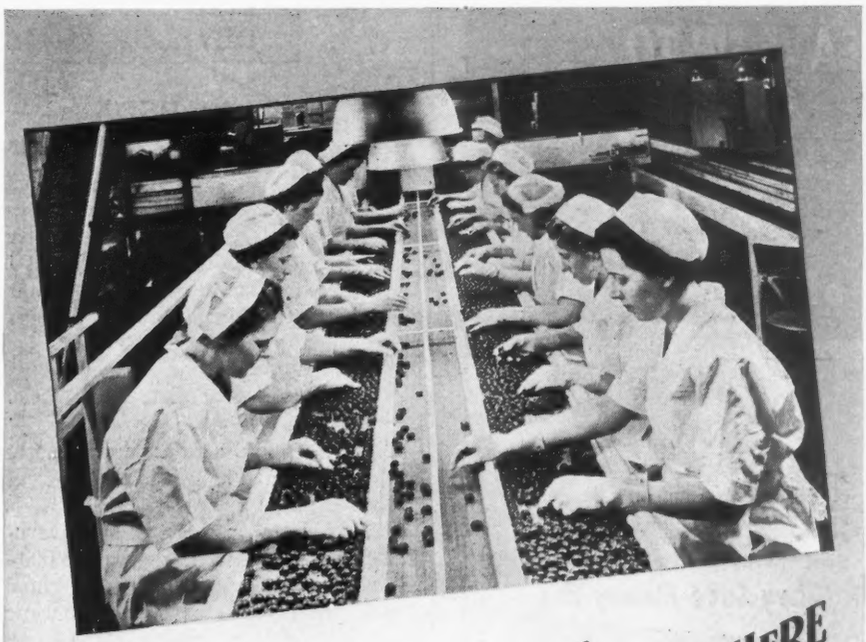
Decision to terminate the course was made because suitable hotel accomodations could not be made. However, the course will be re-scheduled for that area in 1949 if adequate hotel quarters can be provided.

Empowers F&DA

AUTHORITY to inspect and control foods and drugs that have been in interstate commerce, even after they reach a destination, has been definitely granted to the Food & Drug Administration by a new law passed at the end of the last session of Congress. This authority prevailed under the old statute for many years, but the change in phraseology in the 1938 act led the Supreme Court to restrict the power of F&DA.

ASSOCIATION PRESIDENT

Theodore Marks, Recipe Foods, Inc., Baltimore, became president of Mayonnaise & Salad Dressing Manufacturing Assn. at its recent convention in Atlantic City.



WITH FOOD PROCESSORS EVERYWHERE IT'S "O.K." [ORDER KANRY-TEX]!

Leading canners and food processors have for years learned to say: "O.K." (Order Kanry-Tex) for specific reasons:

O.K. ORDER KANRY-TEX for easy cleansing
O.K. ORDER KANRY-TEX for no odor or taste
O.K. ORDER KANRY-TEX for resistance to moisture, fats, oils
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SAVE UP TO 30% of your costs with

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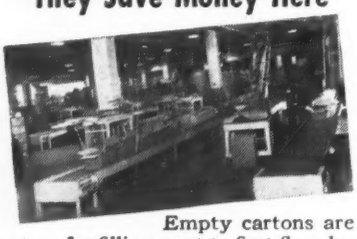
CONVEYORS

Assure a faster straight line movement from raw materials . . . to packaged products . . . to shipping room. Cut materials-handling costs, save floor space, speed up production.

They Save Money Here



Empty cartons are set up for filling, sent to first floor by Lamson Belts and Boosters.

They Save Money Here

Basement boosters (at left) are discharging empty cartons to a horizontal filling belt on first floor.

They Save Money Here

Floor belt conveyors deliver cartons to filling stations . . . then to closing and wrapping machines.

Lamson Pneumatic Message Tubes—supplement conveyors to coordinate control of papers, materials and products.

Lamson—(Allen Billmyre) Blowers, Exhausters and Vacuum Cleaning Systems—are available for processing, conveying, cooling and for every cleaning requirement.

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DEVELOPMENTS IN DISTRIBUTION

Egg Buying by USDA Far Below Last Year

THE Department of Agriculture hoped to be able to end its support purchases of eggs for this year by mid-July. By that date—or at the latest by August 1—USDA purchases will add up to far fewer than the 9,000,000 cases of eggs the government bought last year.

As of the end of June, this year, only 1,000,000 cases of eggs had been bought.

During 1947, the government bought for export about 12,000,000 lb. of frozen eggs, also bought 38,500,000 lb. of dried eggs for the British government, and disposed of another 38,000,000 lb. of dried eggs through the school lunch program and sales to domestic users.

The carryover from 1949 government operations amounted to 49,000,000 lb. of frozen eggs. A part of this carryover—17,000,000 lb.—is now being converted into dried eggs in order to meet the demands of possible consumers.

Government egg buying this year has fallen below last year, too, mainly for one reason.—The high cost of feed, compared to the support price for eggs. All driers and freezers from whom the government buys must certify not only that 35c. per dozen was paid for the eggs they bought to supply the government orders for dried and frozen eggs—but that they paid 35¢ per dozen for all the eggs they bought, whether or not they were bought to process for government orders or for private sales.

The USDA propagandized to the egg producers to cull their flocks and reduce their numbers. The result of high feed prices and the department's program was to cut the chicken population some 15 percent below what it was last year.

Co-Ops Appear Safe Under Dewey Tenure

THERE WILL be no new tax crackdown on co-ops if Dewey gets a grip on the government reins. At least that is the word going out from the Washington headquarters of the farm organizations.

Reason 1: Farm lobbyists take seriously the Republican platform plank, which supports "The principle of bona fide farmer-owned and farmer-operated cooperatives," and they have the skill and the legislative support to make the plank hold up. Dewey himself is a member of the Cooperative G.L.F. Exchange, New York State co-op outfit that has been phenomenally successful in expanding its activities to all kinds and types of business.

Reason 2: Dewey's farm policy ideas have depended largely on co-ops leaders in New York State. H. H. Rath-

Wide World

COULD BE TAFFY—BUT ISN'T

The Frigo Bros. plant at Lena, Wis., is remarkable not only for fine Italian cheese it produces, but also as a family operation. President Pasquale has nine sons and six daughters, while his brother Louis, who is secretary and production manager, has five sons and seven daughters. All are working—or preparing to work—in one of company's ten plants. Three of sons are doing the stretching here.

you win

Every day, more and more flavoring manufacturers are moving into a winning sales position with Ethavan (Monsanto's Ethyl Vanillin).

The distinctive flavor, pronounced aroma and staying power of Ethavan add extra taste appeal to bakery products, candy, ice cream, beverages and other foods in which an aromatic, vanilla-like flavor is desirable. These qualities, plus Ethavan's economy (it's three times stronger than ordinary vanillin), make a sure-to-win combination for flavor manufacturers and processors.

In addition to Ethavan, Monsanto offers Coumarin Monsanto, Methyl Salicylate Monsanto, U.S.P., (Synthetic Oil of Wintergreen) and Vanillin Monsanto, U.S.P., for improved taste and sales appeal in food flavorings. Complete information and samples may be obtained by writing MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. If you prefer, contact any District Sales Office or return the convenient coupon.

Ethavan: Reg. U. S. Pat. Off.

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THE CASE OF

THE PALTRY POPCORN*

A well-known company, which deals largely in popcorn, had decided to expand its purchasing and selling operations. To do this it was necessary to contract for a very large amount of popcorn from a new dealer in a territory comparatively unknown to the firm during its previous operations.

When the shipment of popcorn arrived it was given a routine inspection and found to contain an excessively high percentage of immature grain and foreign contamination. A closer check revealed that the entire lot was far below the company's long established standards of quality, yet it was imperative that the product be delivered on schedule to several new and valued customers.

Two unsuccessful attempts were made to remove the contaminations, but in each case the results showed that not only did the bulk of the shipment remain below acceptable specifications, but that an uneconomical amount of good popcorn was lost in the cleaning.

The corn was then shipped, in its original state, to an affiliated company which was using S S & S Specific Gravity Separators to clean, separate, and classify an entirely different type of edible product.

Production was interrupted, Separator decks changed, necessary adjustments made, and the shipment of popcorn processed on the machines. *Within two days* the entire lot had been cleaned and another sample submitted for inspection. After a thorough test the shipment was pronounced sound and ready for distribution. Furthermore, the loss through cleaning with air-flotation was extremely low and the popping quality of the corn raised *above* that which the company ordinarily guaranteed its customers.

*Second in a series of actual case histories describing the use of S S & S equipment to clean, reclaim, and up-grade agricultural products previously classified as being below commercial standards.

The Case Of The Paltry Popcorn was no mystery to S S & S product engineers. Every hour in every day you'll find our Specific Gravity Separators and Air-Float Stoners serving the food industry with economical high-volume separations of contaminations from virtually every type of product destined for human consumption. Processing equipment wear-and-tear is reduced; end products are up-graded to premium quality; hand-picking costs diminish. If you've got a tough separation or reclamation problem, let an S S & S product engineer have a crack at it. Check the details in our Bulletin FI-848.

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Sixty Years of Specialized Experience in Separations

Dallas, Chicago, Des Moines, Minneapolis, New York City, Pittsburgh, San Francisco, Columbus, Ga., Jackson, Mich.
Foreign: Winnipeg, Canada; San Paulo, Brazil; London, England.

bun, now president of the National Council of Farmer Cooperatives—one of the big four farm organizations—has been a hard worker in the Dewey camp for more than ten years. And he has Dewey's ear any time he chooses to say a word on farm problems. No such compensating figure for the tax paying industries now apparent.

ICC Decision Protects Food Truck Operators

FOOD MANUFACTURERS who use their own trucks to deliver their products across state lines now have a new interpretation from the Interstate Commerce Commission—

You are a private carrier and not a common carrier, ICC decided, if your primary occupation is not transportation.

It did not matter, said the commission, that the Lenoir Chair Co. charged its customers more for transportation than the cost of that transportation. One commissioner dissented, on the grounds that the company sold its production f.o.b., and then charged the customer regular published rail or motor freight rates.

This showed, the dissenter claimed, that the company was engaged in transportation for profit, and should be required to stop operations until it had authority from ICC to operate as a common carrier.

Food Packed in Cans Leads in Popularity

FRUITS AND VEGETABLES in cans are ranked above those in glass, frozen and fresh, both in general economy and general availability, according to a report appearing in the Journal of the American Dietetic Assn. on one of the most important studies on foods undertaken in recent years.

This study of the "Comparative Cost and Availability of Canned, Glassed, Frozen and Fresh Fruits and Vegetables" was compiled in a nation-wide survey conducted for a full year. Results were presented at luncheons held by the Can Manufacturers Institute in New York and Chicago on June 15 and 17.

For the past six years, under the joint sponsorship of the National Canners Assn. and the Can Manufacturers Institute, a solid and growing scientific background of nutritional data on canned foods has been mounting. But with food prices pulling ahead of the all-commodity price index, the Institute decided to finance a new type of study comparing the cost of fruits and vegetables commonly available in various forms—canned, glassed, frozen and fresh.

MEAT INSTITUTE'S 'OSCAR'

Four of these bronze figures of Vesta, goddess of hearth and fire, will be conferred on newspaper food editors for "outstanding excellence in the presentation of news about food." This second annual award sponsored by American Meat Institute will be made September 29 at food editors' conference, in New York City.

Canadian Import Ban Accomplishes Purpose

EFFECTS of the Canadian government's bans, or restrictions, on imports from the U. S. in order to conserve American dollars were recently disclosed in Canada. In the first quarter of 1948, imports under Schedule II (Quota List) of prepared foods dropped to $257,000 from scheduled countries, such as the U. S., as compared with $1,550,000 in the similar period of last year. Imports from non-scheduled countries increased to $1,080,000 in the first quarter of 1948 as against $333,000 in the corresponding period a year ago.

"I am glad to say that these comparisons show a satisfactory record of progress to date in the saving of dollar exchange," said Finance Minister Abbott in a statement in Ottawa on the Canadian Government's import bans.

"Furthermore, it is probable that the reduction of hard currency imports under the two schedules will be even greater in subsequent quarters of this year, since imports in the latter part of 1947 were heavier than in the first quarter," Mr. Abbott hinted, this being interpreted as suggesting that the bans or restrictions on American food industries' shipments into Canada may continue on the present basis for some time to come.

A Reminder to Food Processors working with Fibrous Materials:

YOU CAN GET A PREMIER MILL WITH CARBORUNDUM ROTOR AND STATOR

Many users of colloid mills in the food industries are taking advantage of this fact: *for processing materials of fibrous or cellular structure, the Premier Colloid Mill is available, now as always, with carborundum rotor and stator.*

Whether it is to be used for the fine grinding of fruits, vegetables, meats or fibrous pastes of many kinds, a Premier Mill can be furnished with the correct type of carborundum for the material. It may be (1) standard face (narrow) multiple grit, (2) wide face multiple grit or (3) coarse single grit. Whatever type is chosen, the combination of rugged surface and many points of contact is assured.

Other food processors working with clear liquids, emulsions or materials of crystalline structure, use the Premier Colloid Mill with the stainless steel rotor and stator.

Dispersing . . . disintegrating . . . emulsifying . . . homogenizing — all are jobs in which the right type of Premier can do efficient work economically while improving product quality. Write us about your processing problems and let us tell you which type Premier can serve you best.

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PREMIER MILL CORPORATION

108 Genesee Street, Geneva, New York

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NAME_____ TITLE_____

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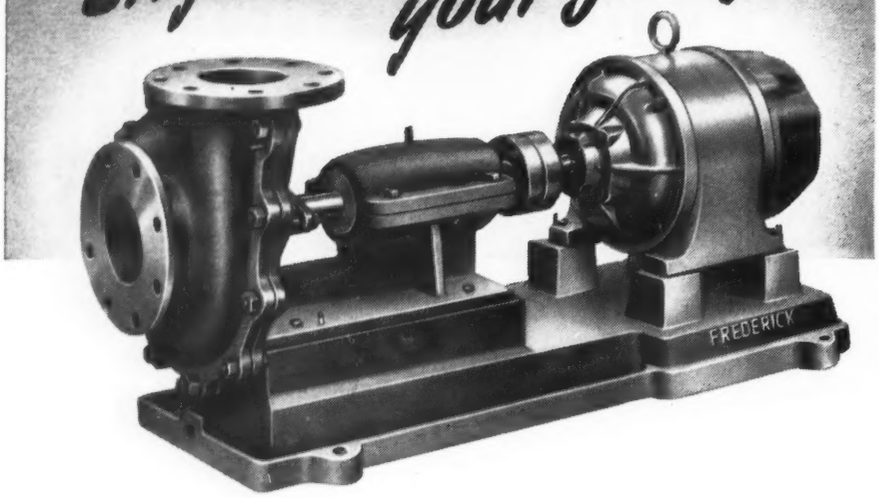
Engineered to fit your job!



Designed in accordance with the demands of the food industry — Splash-proof and totally enclosed ball-bearing motor—Engineered to assure the efficient handling of any fluids and to give you continuous operation —Materials and workmanship of the finest—In constant use today in many different types of food plants.

Send for this booklet on Double Suction Single Stage Pumps. Attractive and colorful, it shows cutaway-views of Frederick Centrifugal Pumps and gives details of their construction and operation. There is no obligation. Write, wire or phone your inquiry today. Ask for Bulletin 104.

Frederick

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Pump Division REPRESENTATIVES IN PRINCIPAL CITIES **Frederick 3, Md**

ALSO MANUFACTURERS OF FRECUT AND FREFORM METALWORKING MACHINERY, FREDERICK STOKERS AND ASH CONVEYORS AND A COMPLETE LINE OF GRAY IRON CASTINGS.

Canned Shrimp Inspection

Food & Drug Administration inspection of canned shrimp requires compliance with certain approved practices, among which is adequate processing time. These times vary, depending on type and size of container. With the introduction of new type swirling retorts about eight years ago, replacing some of the old baffle type retorts, less time was needed for processing.

F&DA inspectors have recognized that fact, and the *Federal Register* of June 4 carried amended official regulations proposed to conform with current practice.

Canada's Dime Loaf Called Best Bread Buy

The Special Committee of the Canadian Parliament investigating rising prices was informed that customers got more for their money when they purchase 10-cent loaves of bread than the more expensive brands, which cost 14 cents. Dr. L. B. Pett, Chief of the Nutritional Branch of the Health Department, of the Canadian Government, discloses that his staff analyzed 10-cent loaves and others to reach this decision.

Dr. Pett revealed that eight 10-cent loaves and 10, which sold for 14 cents, were studied as brands and it was found that three of the 10-cent brands weighed fractionally less than the standard 1½-pound weight, while five of the 14-cent brands were slightly below. The cheaper loaves averaged 1,845 calories. The more expensive ones showed an average of only 1,797 and Dr. Pett said that bread's chief importance as a food is in its calorie value.

"The 10-cent loaf is a better buy and would be even if the price were the same," he said, though he told the Special Committee he would not concede the cheaper loaves much nutritional superiority since the difference, 48 calories, is very slight.

Protein content of the various breads varied only slightly. There was a more noticeable difference in the fat content but Dr. Pett said its effects would scarcely be noticeable to the housewife.

Cheese Regulations

A Hearing was scheduled by Public Health Service, for June 15, to discuss exemption of Swiss, Roquefort, Gorgonzola, and blue mold cheeses from their pasteurization requirement. Present P.H.S. regulations covering food served on interstate rail, air, and water carriers require that all milk products shall be pasteurized or manufactured from pasteurized milk. Indications before the hearing were that this exemption, would receive attention.

McGRAW-HILL *World News*

Fiji to Can Tuna Fish For American Market

MELBOURNE—A Fiji pineapple canner, A. C. McCown, has completed arrangements with two Californian fish packers to exploit the tuna fisheries in the south-eastern Pacific. The two American firms are the French Sardine Co. and the J. B. Romano Co.

Two new companies will engage in the tuna trade as a result of this deal. One will be set up in Fiji with a 40 percent American capital investment. The second company will operate in California with 40 percent Fiji capital stake.

Main objective will be the catching and canning of fish for the American market. Varieties not readily acceptable to U. S. consumers will be processed for shipment to Empire territories. Important subsidiary lines will be provided by the production of fish meals, fish fertilizers and vitamin oils.

The 1000-ton fishing ship *Anthony M*, which has been completed at a cost of $250,000 in an American dockyard, is expected in Fiji shortly. It is one of the first craft in the southwest Pacific to be equipped with radar aids.

USSR Studies Preserving By Super High Pressure

Moscow—Soviet research in the field of food-processing, a major state enterprise, is carried out at the Institute of Nutrition of the Soviet Academy of Medical Sciences, which maintains a large staff of physiologists, biochemists, technicians, hygiene and clinical researchers.

Outstanding among many research projects aimed at improving the quality of canned goods in the USSR is the Institute's experimentation with a new process of preserving employing super high pressure (from 5,000 to 8,000 atmospheres). This method is now under study as a substitute for thermal sterilization.

Under such high pressure harmful microorganisms are utterly destroyed, the Institute reported recently, adding that its tests disclosed raw milk, meat and other fresh foods could be preserved in practically unaltered form by means of the high pressure process.

The Institute's research is aimed at finding means to eliminate alterations

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"Pipeline Policemen"
A good strainer protects your equipment and pipeline.
These little Yarway "guardians of the pipelines" have literally taken industry by storm. In the few years since their introduction, hundreds of thousands have been bought . . . are daily giving top satisfaction in a variety of services.
HERE ARE SOME OF THE REASONS:
SCREEN—a high-grade woven monel wire basket that catches solids—lets condensate, oil or other fluids flow freely. Perforated screens if desired.
SCREEN CAP—easily removed. Cap and screen come out together. Screen automatically aligns when replaced. Machined face and spark-plug-type gasket provide tight joint.
BODY—rugged iron or steel, cadmium-plated for protection against corrosion and for better appearance.
SIX SIZES—½" to 2" for pressures up to 600 lbs.
AVAILABILITY—stocked and sold by 150 Mill Supply Houses. Reasonably priced.
See your local dealer or write for Bulletin S-201.
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YARWAY STRAINERS
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A "Geyer" Preserve and Jelly Filling Machine.

Fine
FILLING MACHINES FOR DIVERSIFIED NEEDS

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JAMS	GREASE
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CHEESE	PEANUT BUTTER
GLUE	APPLE BUTTER
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AND SIMILAR PRODUCTS

"GEYER" Filling Machines are versatile, durable and adaptable to innumerable packaging requirements. All have these features:

MULTIPLE FILLING • MINIMUM WEAR • VARIETY OF MACHINE SIZES • HIGH QUALITY WORKMANSHIP • POSITIVE PISTON DISPLACEMENT • HIGH OPERATING EFFICIENCY • FULL AUTOMATIC OPERATION.

Under critical operating conditions there is no drip, machines are clean filling, and readily adjustable to any size or shape container. Maximum production output assured.

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CHICAGO (4) Clyde E. Austin & Son, 53 W. Jackason Blvd.
DENVER (9) Edwin F. D... Co., 224 W. Alameda ...
SAN FRANCISCO (5) J. B. Bellamy & Co., 111 Main St.

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that take place in the vitamin content, the salt and albumin composition, and the taste qualities of vegetable, meat and fish products during canning. A new method of preliminary treatment and subsequent sterilization of meat, developed at the Institute and being applied at certain canning plants, is described as resulting in production of preserved meat that does not differ in taste from ordinary roast meat, fried liver or steak.

The Institute is also developing an objective method for evaluating the food quality of various vegetables—cabbage, carrots, beets, peas, etc.—with the object of selecting the best sorts for large scale planting and farm cultivation.

Division of India Brings A New Search for Salt

NEW DELHI — Intensive studies of possible sources of salt are being made in India as a result of the splitting off of Pakistan, which placed the enormous Khewra fields in the new dominion. Most promising so far appears to be deposits in the state of Mandi in the Punjab.

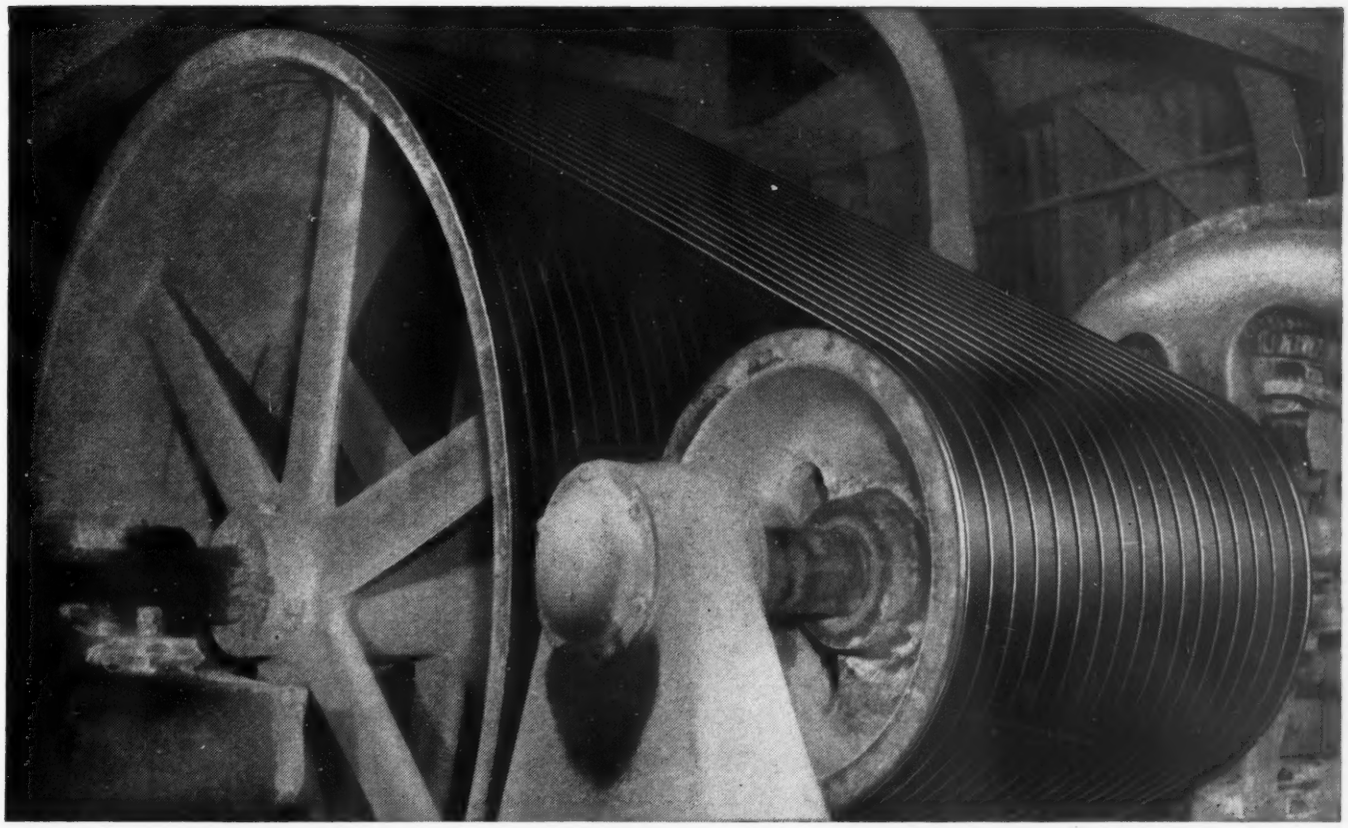
Preliminary surveys indicate deposits some 40-mi. in length, a quarter-mile in width, and 100 ft. thick. Purity is only 75–80 percent, however, and there is a thick overburden of traprock and limestone. But hydraulic mining is regarded as feasible.

Food Technology Gains Australian Recognition

SYDNEY—The training of food processing specialists has been placed on an academic basis in Australia with the inauguration of a diploma course in Food Technology at the Sydney Technical College.

No other university or college in the Commonwealth has yet followed Sydney's example. But a new body, the Food Technology Assn., has now been established in Melbourne to provide executives in the food maufacturing industry with both the fundamentals and the latest developments in food technology. The association's course will cover cost, materials, labor, factory layout, engineering, chemistry, bacteriology, packaging, marketing and the legal aspects of food processing. The new group's president is F. C. Elsworth, of Dewey & Almy, Ltd. Vice-presidents are H. G. Osborne, of Kraft Walker Cheese, Ltd., and R. H. Cunningham, of Keith Harris & Co.

Kraft Walker Cheese Co. has individually announced a training plan for ambitious employees. Endorsed applicants will be enabled to study for two years at a technical college.



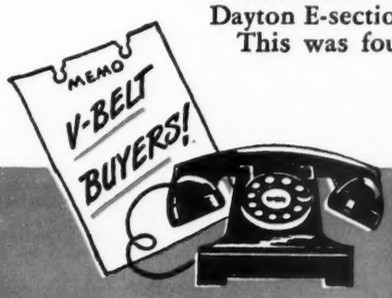
Production Rises Sharply When Drive Slippage Eliminated on 60-Ton Grinder

This ponderous tube mill of a large Wisconsin quarry pulverizes crushed stone into 100-mesh fineness for making agricultural lime. Loaded, the mill weighs 60 tons! Starting it from a dead stop and keeping it turning as chunks of stone resist the grinding action requires a drive with terrific pull. The original drive couldn't deliver . . . slipped constantly . . . slowed production seriously. According to the plant superintendent "the belt was off the pulley more than it was on". On the recommendation of the local Dayton V-Belt Distributor a drive of 17 standard Dayton E-section V-Belts was installed.

This was four years ago. Since then slippage has been completely eliminated, there has been no stalling of the tube mill and production has risen sharply.

Your local Dayton V-Belt Distributor can assist you in solving similar power transmission drive problems. With his specialized knowledge he can correct nearly 95 per cent of all power drive troubles by using standard Dayton V-Belts and the power drive accessories that he stocks. If additional engineering knowledge is needed he can quickly secure the aid of a Dayton Power Transmission engineer. So for prompt, profitable solutions to your drive problems call your local Dayton V-Belt Distributor.

THE DAYTON RUBBER COMPANY
Main Office and Factory: Dayton 1, Ohio
Branch Offices: Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Los Angeles, Minneapolis, New York, Philadelphia, St. Louis

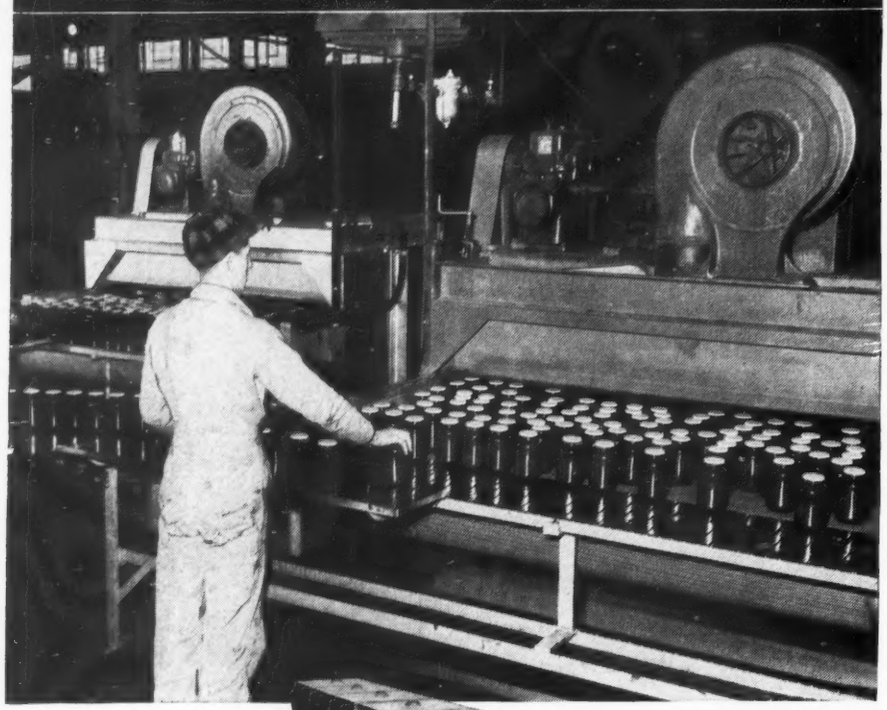


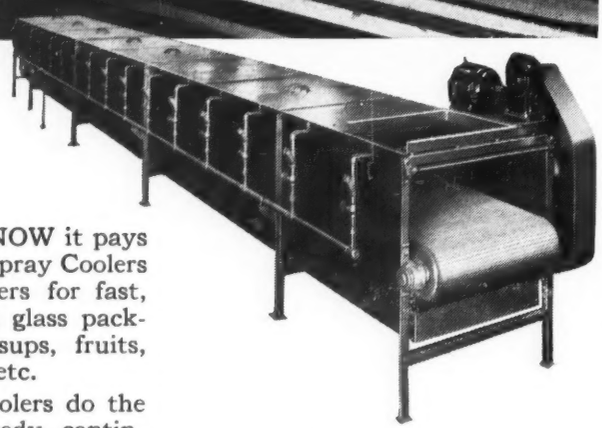
V-Belt Buyers! A leading mill supply house near you offers specialized Dayton V-Belt service. Look for the name under the trade name heading "Dayton V-Belts" in the yellow pages of your telephone directory.

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

For continuous, faster cooling in your processing . . . cut costs with FARQUHAR Spray Coolers





PROCESSORS KNOW it pays to use Farquhar Spray Coolers and Pasteurizer-Coolers for fast, gradual cooling of all glass packaged foods . . . catsups, fruits, jellies, pickles, juices, etc.

Farquhar Spray Coolers do the cooling job in one speedy, continuous operation. The first two spray headers use hot water for tempering the glass, the remaining headers use tap water. Pumps recirculate both hot and cold water, holding water consumption to a minimum.

When required, Farquhar Pasteurizer-Coolers do the combination job faster *in one complete operation*—eliminate extra handling from pasteurizer to cooler. The glass containers are carried from pasteurizer to cooler on a continuous, galvanized woven-wire belt.

You can operate Farquhar Spray Coolers and Pasteurizer-Coolers at any required speed. Both units are built in various sizes to handle any capacities.

For complete information on Farquhar Food Processing Machinery, write to: **A. B. Farquhar Co., *Special Machinery Division,* 1202 Duke Street, York, Pa.**

Farquhar

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TRIMMING TABLES • PASTEURIZER-COOLERS • CONVEYORS

Given Three Factors Oysters Will Spawn

MELBOURNE—Japanese "seed" oysters may no longer be required to keep oyster beds in production as the result of a disclosure made to an investigator for the Australian Council for Scientific & Industrial Research by a Japanese scientist. Prof. Takeo Imai, of Tohoku University, Sandai, revealed in an interview with E. J. Ferguson Wood that oyster spawning is induced by a proper balance of biological oxygen, chlorine and water temperature.

By regulating the three factors within close limits, oysters can be induced to spawn in breeding tanks. Under natural conditions the required balance is produced by seasonal factors, particularly by the discharge of fresh water into the sea. This explains why oysters breed near the estuaries of rivers and why conditions favorable to spawning are not found everywhere.

The fisheries laboratory at Cronulla is planning to develop Professor Imai's discovery into a practical method of breeding oysters in tanks. This will be insurance against the failure of the Japanese specimens to reproduce by natural means. It may also end a major worry of U. S. and Australian oyster growers.

SCHEDULE OF EVENTS

August

9–12—International Apple Assn., 54th annual convention, Hotel Pennsylvania, New York City.
9–20—Gordon Research Conference, Colby Junior College, New London, N. H. (9–13 Vitamins and Nutrition; 16–20 Food and Nutrition.)
10–13—Western Packaging Exposition & Conference on Packaging, Packing and Shipping, Civic Auditorium, San Francisco.

September

2– 3—Cornell University, dairy industry conference, Willard Straight Hall, Ithaca, N. Y.
8–19—3rd International Food Show, Parma, Italy.
11–19—Minneapolis Retail Grocers Assn., national food show, Auditorium, Minneapolis.
13–15—American Soybean Assn., 28th annual convention, Hotel Peabody, Memphis.
13–17—Instrument Society of America, national conference and exhibit, Convention Hall, Philadelphia.
19–21—Southern Bakers Assn., exposition and production conference, Municipal Auditorium, Atlanta.
20–22—American Meat Institute, 43rd annual convention, Waldorf-Astoria Hotel, New York City.
20–23—University of Minnesota, dairy products institute, St. Paul Campus, St. Paul, Minn.
23–25—National Coffee Assn., annual convention, Mount Washington Hotel, Bretton Woods, N. H.
27–Oct. 1—Newspaper Food Editor' Conference, Waldorf-Astoria Hotel, New York City.

October

12–16—National Chemical Exposition and Industrial Conference, Coliseum, Chicago.
14–15—Packaging Institute, 10th annual forum, Commodore Hotel, New York City.
25–28—National Frozen Food Locker Assn., 9th annual convention and exhibition, Sherman Hotel, Chicago.
25–30—Dairy Industries Exposition, Convention Hall, Atlantic City, N. J. (25–27 International Assn. of Ice Cream Manufacturers, Traymore Hotel; 28–30 Milk Industry Foundation, Chalfonte-Haddon Hall).

Changes in Food Supplies

Production

Creamery butter production in May, estimated at 132,495,000 lb., gained 32 percent over April, which compared with a 26 percent seasonal increase between same months last year. Average April-May gain during five-years 1942-46 was 30 percent.

Ice Cream output in May is estimated at 54,070,000 gal., a 13 percent drop from May, 1947, but 14 percent larger than five-year average for month. April-May gain was 7 percent, compared with a 17 percent gain last year and a five-year average increase of 19 percent.

American cheese production in May was 14 percent smaller than in same month last year. Estimated at 102,110,000 lb., this output represents an increase of 39 percent over April, and is about 1 percent above five-year average.

Wheat flour production in April, estimated at 21,100,000 sacks, was 1.4 percent higher than March output. While this was a slight rise in face of a normal seasonal decline, production was still 11 percent below that of April, 1947.

Lard production came to 142,096,000 lb., in May, a considerable increase over from 120,257,000 lb. produced in April.

Materials

Wheat and rye production in Europe was estimated at 54,000,000 long tons in early June, which compares with last year's very short crop of 40,000,000 long tons, and 1946 harvest of 48,000,000 tons. This June 1948 total is about 15 percent below prewar average of 62,000,000 long tons. General crop outlook for most of Europe and Soviet Union also continued favorable.

Total meat production in March was 5 percent larger than in February, but 2 percent under March 1947. Production of all meat for three months, January to March, was 7 percent less than same period last year.

Sour cherry production for States of Michigan, Wisconsin, Pennsylvania and New York is forecast at 99,260 tons, as of June 15. This is 6 percent above June 1 estimate, and would be 24 percent above last year, though 3 percent below 1946 record crop.

Peanuts milled during May reached a total of 171,000,000 lb., largest May milling on record and 33,000,000 lb. above previous May record, set in 1945. Total for season to date (September 1947–May 1948) amounts to 1,572,000,000 lb.

Spring pig crop totaled 51,421,000 head, a decline of 3 percent from last spring. Number of sows farrowing, this spring, however, was 8 percent below last spring. With indications that fall crop will be about same as last year, total 1948 crop is expected to reach 82,400,000 head. Combined crop would thus be 2 percent below 1947, and 5 percent below ten-year average.

World sugar production for 1947-48 is estimated at 34,147,000 short tons, which is 10 percent more than was produced the previous year, but 2 percent less than 1935-39 average of 34,710,000 tons. Figures include cane and beet sugar.

Stocks and Storage

Wholesaler distributor stocks on June 1, as compared with a year ago, were off 34 percent for green and wax beans and 25 percent for peas. Corn stocks were about same, but tomato holdings were up 31 percent. Except for apricots, however, canned fruits were far above previous year: Peach stocks were up 29 percent; pears 55 percent; pineapple more than 100 percent; and mixed fruits almost 200 percent. Apricots were down 38 percent.

Public freezer occupancy was at 70 percent on June 1, the first time in history that occupancy did not increase during May, having been at 70 percent on May 1.

Cooler occupancy rose only 3 points during May, standing at 65 percent on June 1.

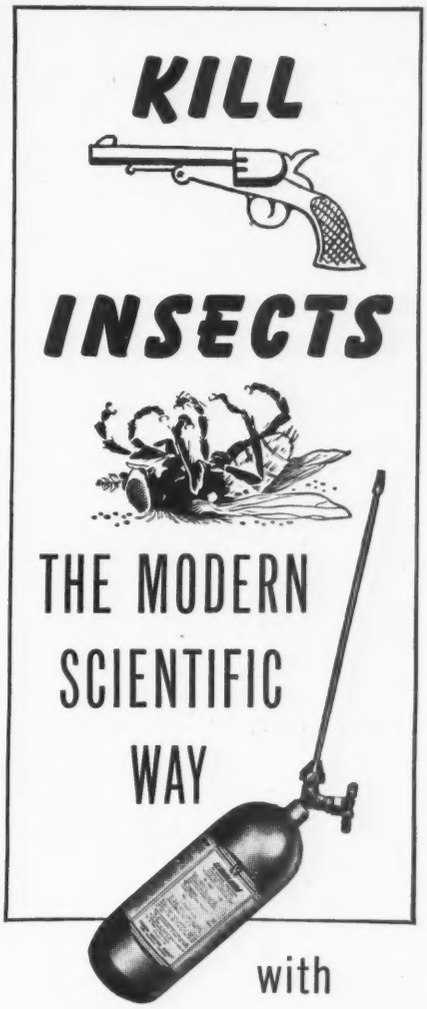
Indexes

The commodity price index on food, compiled by the New York Journal of Commerce—rose to 214.5 for the week ending July 17. It was 211.0 for the preceding week, 204.8 for June, and 193.5 for July, 1947.

Business Week's index of business was 193.4 for the week ending July 10, which compares with 192.5 for the preceding week, 195.3 a month previous and 175.0 a year ago.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded July (thousands)	Awarded 1948 (thousands)
Bakery	$138	$294	$6,307
Beverages	100	70	11,382
Canning and Preserving	80	....	320
Cold Storage	75	100	1,386
Confectionery	500	....	2,253
Grain Mill Products	495	75	6,345
Ice, Manufactured	....	....	70
Meats and Meat Products	225	....	1,142
Milk Products	245	225	4,329
Miscellaneous	5,843	186	7,835
	$7,701	$950	$41,369



Lethalaire V-20 kills insects, from cockroaches to silverfish . . . does it scientifically, economically, effectively . . . without waste, without the labor and messiness of hand-spraying. It does not contain DDT. It will not contaminate food. Lethalize with Lethalaire. See your supplier today, or mail the coupon for further interesting information.

VIRGINIA SMELTING COMPANY FI-8
WEST NORFOLK, VIRGINIA

Please tell me more about the Lethalaire method of controlling insects.

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VIRGINIA Chemicals

50 Years of Service to Industry

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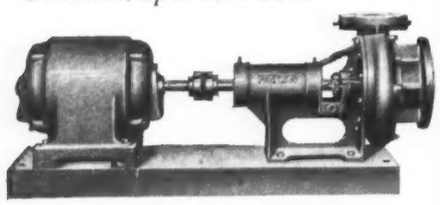
THE PEERLESS

Fluidyne

fmc PEERLESS PUMPS

THE ALL-AROUND ECONOMICAL GENERAL UTILITY CENTRIFUGAL PUMP

HEADS: *Up to 270 feet*
DRIVES: *Fractional to 20 hp*
CAPACITIES: *Up to 1000 GPM*

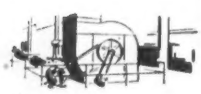


Type PB direct-connected to standard motor

Durability – Economy – Plus Wide Utility for a Multitude of Services

FACTORIES

The versatile Peerless Fluidyne is pumping simplicity at its best. Peerless FLUIDYNE Type PE (Electric drive unit) or the Type PB (direct connected, V-belt or flat belt drive unit) are designed for vertical, horizontal or intermediate angle installations, with consistent and dependable high efficiency operation. *Completely described in Bulletin B-165.*



SYSTEM SUBASSEMBLIES

FLUIDYNE FRACTIONAL HP PUMPS ¼ TO 1 HP
CAPACITIES: *10 to 50 GPM*
HEADS: *20 to 95 ft.*

BUILDINGS

FOOD PACKERS

Possessing all characteristics of the Types PE and PB pumps described above, these fractional Fluidyne Peerless Pumps may be coupled to motor for incorporation into any system requiring forced liquid circulation. All Fluidyne pumps are of end suction, single stage design with vertical split casing joint, and embody a host of features for ease of accessibility and maintenance. *Completely described in Bulletin B-150 and B-151.*

Type PE Integral HP Electric Unit

PEERLESS PUMP DIVISION

FOOD MACHINERY CORPORATION

Factories: **Los Angeles 31, Calif.; Indianapolis, Ind.**

District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 No. Broadway; Atlanta Office: Rutland Building, Decatur, Georgia; Dallas 1, Texas; Fresno, California; Los Angeles 31, California

What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

TAX EXEMPTION—Puerto Rico has now identified certain specific types of new enterprise, which are exempted from both income tax and property taxes, all to encourage new installations. In some cases the tax exemption extends until 1962. Among the wanted industries are canned foods, cheese, candies, crackers, edible fats and oils, candied fruits, food pastes, tin containers, and a number of others interesting to food enterprise.

MILK PRICING—The dairy industry throughout the country will want to look over the new kind of milk-pricing formula which went into effect this spring in greater Boston and nearby Massachusetts. The significant new factor is "an adjustment device which ties the price of milk directly to the conditions of demand and supply in the market." This is a novel approach, because no longer is there an attempt by agreement to override the law of supply and demand. This conformity with economic law ought to eliminate many arguments and social strains.

CONSUMER DEMAND — Official Washington says that "consumer demand continues at high levels". This applies to almost all foods as well as to food raw materials on the farm. The most notable exception in Washington comment is the group of canned and processed foods, demand for which lags below any recent year.

TARIFF PROJECTS — Less spotlighted than other political controversy during the last weeks of Congress—but the cause of bitter under-the-surface battling—were two tariff problems. One was the question of extension of the Trade Agreements Law. The other, unnoted but more fundamental, was the question of adherence to the proposed International Trade Organization.

The latter, if it works out as the free-traders wish, would become something of a super-tariff-commission for the world, working under United Nations, of course. It appears as if the ITO., though negotiated at great length in sessions at Havana last winter, will not be a matter of accepted U. S. policy very soon. Meantime, the U. S. has become a low-tariff nation through executive cuts in rates of duty.

SUGAR RECOVERS—World production in the fiscal year which closed July 1 amounted to 34,150,000 short tons of sugar. This represents an increase of 10 percent over the previous year and only 2 percent less than the 5-year prewar average of 1935–39.

Notable is the cane sugar recovery. Present rate of output exceeds prewar by about 10 percent, both in eastern and western hemispheres. Beet sugar come-back has not been as fast, but last year the output was approximately 80 percent of prewar. All this indicates plenty of sweeteners for the food business.

PAY RATES—Ruling of the Supreme Court on what overtime pay rates apply, as announced during mid-June, was something of a straddle. Managements must note that under the wage-hour law overtime payments will be based on the new definition of "regular rate of pay."

Where the pay is for night work, or other undesirable types of assignment where base rate is higher than for normal day workers, then overtime will be calculated on the higher figure for those so engaged beyond the 40-hr. week. But there is no danger of "pyramiding" overtime on overtime, as many feared. One will guess that the lawyers still have many fat fees coming from legal cases not yet clearly fixed by this top-court decision.

RESERVE OFFICERS—Members of the Reserve Officers Corps of Army, Navy, and Air Force will all be interested in the new informal training programs being organized under the leadership of the personnel branch of the General Staff Corps, Research & Development Group. That agency is organizing groups of commissioned reservists in various locatalities for a triple pur-

CHANGE OF ADDRESS

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330 WEST 42nd STREET, NEW YORK 18, N. Y.

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New Title or Position .....

pose. The individuals will get better acquainted with the military problems. The military will identify skills which need special assignment in an emergency. The individuals of these groups will be permitted to make special studies of value to the departments and thus earn advancement in reserve rank. Substantial advantage is expected for the individuals who participate.

It would be particularly welcome if a group of reserve officers interested in a common problem like foods for the Quartermaster Corps were to act together in any one locality. It looks like an unusually favorable opportunity for professional group action.

STUDY CLAMS—Fish & Wildlife Service of the Department of the Interior was authorized and directed by Congress to undertake studies of soft-shell and hard-shell clams "with particular respect to the biology, propagation, and methods of cultivation".

In cooperation with appropriate agencies, the Service shall from time to time "recommend appropriate measures for (1) arresting depletion in existing productive beds; (2) restoring to production beds formerly productive but now barren or unusable; (3) developing new areas which may be found suitable; (4) improving methods and techniques of digging, transplanting, and handling; and (5) otherwise increasing production and improving the quality of such clams for the benefit of both producers and consumers".

ALCOHOL PLANTS—To the surprise of Department of Agriculture officials, who had requested only one of the three wartime constructed alcohol plants, all three plants were transferred by Congressional legislation from War Assets Administration to U. S. Department of Agriculture. Legal details of title transfer may require a couple of months for completion.

Muscatine, Iowa, and Omaha plants are operating. The Kansas City plant was not under lease at the turn of the fiscal year, although negotiations were being considered at War Assets Administration. Muscatine plant, in addition to its beverage alcohol activities, was making potato flour, and the Omaha plant was preparing to do likewise, both operations being based on surplus potatoes delivered by the Department of Agriculture at 15c. per 100 lb. The Muscatine plant was also launching a large scale production test on fungal amylase.

IT IS "INTERSTATE"—Congress decided that food and drugs do not pass out of the inspection and regulatory control of Food & Drug Administration just because they have come to rest after interstate shipment. Inspection and disciplinary action are now going to be possible on goods "at rest" if either illegally shipped or dangerously contaminated after interstate shipment before reaching the ultimate consumer control. Thus plugged is a loophole which some "smart" executives tried to find in the law.

No Extra Cost

Ordinary

to replace corn starch

NATIONAL ALSO PRODUCES

PURITY "C" a quality starch thickener for cream and fruit fillings; CLEARJEL a scintillating fruit pie stabilizer that is unexcelled for clarity, color and flavor; FLOJEL candy starches in all accurately controlled fluidities; PURITY MOLDING STARCH properly lubricated for gum drops, etc.; PURITY GLAZE an oil-sealer for coating almonds; and PURITY "PWS" a complete salad dressing starch.

Why no extra cost? National's policy of giving you more for your corn starch dollar! MELOJEL is actually a premium corn starch. It's double-refined.

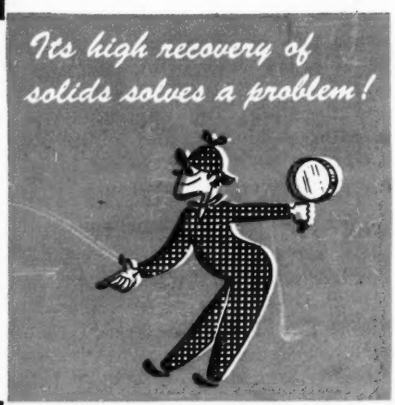
Why should you use it? Happier customers! Cereal taste is minimized in ice cream cones, cream and fruit pies, pastry fillings and puddings. Fillings have a softer, smoother jell with a creamier texture and better resistance to watering.

What happens to your formulas? Nothing! Simply cross out the words *corn starch*. Write in the name MELOJEL! It's always in full supply.

Offices: 270 Madison Ave., New York 16; Boston, Philadelphia, Atlanta, New Orleans, Indianapolis, Chicago, San Francisco, and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto and Montreal. And in Holland: Nationale Zetmeelindustrie, Veendam.

National
STARCH PRODUCTS

STARCHES — AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY



IT'S THE NEW LOW TEMPERATURE BUFLOVAK EVAPORATOR THEY'RE TALKING ABOUT!

You will surely want to know about this new Downflow Evaporator built by BUFLOVAK. It operates at unusually low temperature . . . suitable for the most delicate materials!

New features include large capacity, with only small quantities of material in the evaporator, and an extremely short processing cycle! Furthermore, its high rate of recovery of solids means real savings to you in your processing.

At all times, you get uniform heating with BUFLOVAK'S Low-Temperature Evaporator, so important in processing delicate heat-sensitive products.

We cordially invite you to write today for full details on this New BUFLOVAK Evaporator.

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Division of Blaw-Knox Co.
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BUFLOVAK
CHEMICAL AND FOOD PROCESSING EQUIPMENT
includes:
DRYERS
EVAPORATORS
SOLVENT, RECOVERY EQUIPMENT
PROCESSING KETTLES

MEN • JOBS • COMPANIES

INDUSTRY

Canada Dry Ginger Ale Co., resumed construction of $300,000 bottling plant extension in Montreal, Canada. Company also plans to build a bottling plant at Vancouver, B. C.

Consolidated Products Co. Inc., New York City, has purchased corn sirup plant of Waverly Sugar Co., Waverly, Iowa. Layout comprises 22 acres of land, 200,000 sq. ft. of factory space, and fully equipped 130,000-bu. grain elevator.

Corn Canners' Service Bureau, formerly in Chicago, has re-located its executive office in Madison, Wis. New mailing address is P. O. Box 1229, Madison.

Farley Manufacturing Co., candy manufacturers, Chicago, has started construction of a modern steel, concrete and face brick, one-story plant, in Skokie, Ill.

Glidden Co. has purchased 46 acres of land at Macon, Ga., to construct a new $2,500,000 food products plant. Margarine, salad dressing and shortening will be main products.

Hathaway Bakeries, Inc., Cambridge, Mass., has acquired all of 11,307½ capital shares of Kelley Baking Co., Inc., Syracuse, N. Y.

McLean County Cold Storage Co., a subsidiary of McLean County (Ill.) Farm Bureau, has purchased packing plant of Louie Heller & Sons, Bloomington, Ill. Price was $90,000.

Modern Food Process Co., Philadelphia, producer of Thrivo Dog Food, has sold entire outstanding capital stock to interests closely identified with P. J. Ritter Co., Bridgeton, N. J.

Orange Crush, Ltd., Toronto, has begun partial production in new $1,500,000 bottling plant. Two old plants will be replaced by new construction.

Pfeiffer Brewing Co., Detroit, is installing 24 glass-lined tanks to increase fermenting and aging facilities from 433,280 to 1,245,280 gal.

Ralston Purina Co., St. Louis, has awarded a contract to Blaw-Knox Co.'s Chemical Plants Div. for construction of a new 200-tons-per-day soybean extraction plant at Iowa Falls, Iowa.

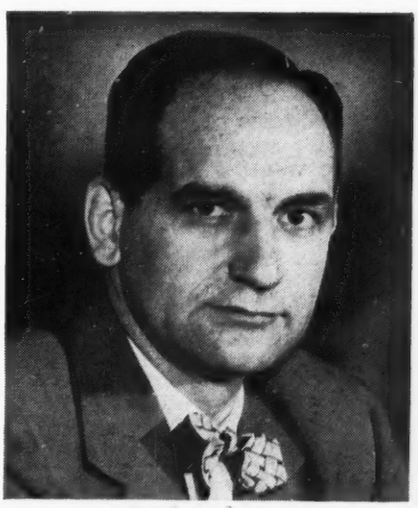
Schultz, Baujan & Co., Beardstown, Ill., began work on $400,000 addition to present mill. Output capacity is expected to triple.

C. L. RUMBERGER

Appointed general manager of research and quality control division of H. J. Heinz Co., he has had 20 yr. experience with organization, which he joined following graduation from Pennsylvania State College. In his new position, he succeeds C. F. Mayer, who is retiring because of ill health.

MILTON E. PARKER

Appointed professor in charge of food technology program at Illinois Institute of Technology, Chicago, he has an extensive background in food chemistry dating back to 1924. Included in his experience are associations with Walker-Gordon Laboratory Co., Philadelphia Dairy Products; National Dairy Products Corp., Beatrice Foods Co.



JOHN I. THOMPSON

Resigning as president of J. I. Thompson & Co., Washington, D. C., he enters USDA as Asst. Administrator to guide marketing research provisions of Hope Flannagan Act and also becomes director of CCC.

BENJAMIN G. FORREST

Executive vice-president and treasurer of Wilbur-Suchard Chocolate Co., Inc., Lititz, Pa., he returned to U. S. in July, after an extended business trip visiting European Suchard factories.

Shedd-Bartush Foods, Inc., Detroit, has purchased Wheatly Goods, Inc., Louisville, for $500,000. Wheatly also has plants in Terrell, Tex., and Jacksonville, Fla.

Specialty Foods Corp., food manufacturer and dealer, has been incorporated in Binghamton, N. Y., with a capital of $100,000.

A. A. Walter & Co., Inc., has opened a new, enlarged potato chip plant in Colonie, N. Y. Company has been making Blue Ribbon potato chips in Albany since 1900.

William Wrigley, Jr., Co., Chicago, has started construction of a six-story warehouse which will contain approximately 100,000 sq. ft. floor space.

Fire Losses: Boonville Mill Elevator Co., Boonville, Mo., machinery and stored grain, $50,000, June 1 . . . Dutch Maid Food Packing Co., Allentown, Pa., more than 100,000 lb. of flour, $100,000 damages, May 28.

Speed pays...whether it's

Movies Newsreels and preview films get the "Air Express treatment" because the motion picture industry knows *speed pays.*

Aviation To get replacement parts the *fastest way,* the aviation business uses Air Express regularly. *Speed pays.*

Wholesaling Many wholesalers standardize on Air Express shipment for supplies. This way they offer wider variety, better service and still keep inventories low. *Speed pays.*

Speed pays in your business, too!

And when you're talking speed, remember Air Express is the *fastest possible way* to ship or receive. Shipments go on all flights of Scheduled Airlines. That means round-the-clock service—no waiting around. Door-to-door service at no extra cost. Rates are *low.* 27 lbs. goes 900 miles for $7.46; 8 lbs. for only $2.57. Phone local Air Express Division, Railway Express Agency, for fast shipping action.

- Low rates—special pick-up and delivery in principal U.S. towns and cities at no extra cost.
- Moves on all flights of all Scheduled Airlines.
- Air-rail between 22,000 off-airline offices.

AIR EXPRESS

AIR EXPRESS GETS THERE FIRST

Rates include pick-up and delivery door to door in all principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE

SCHEDULED AIRLINES OF THE U.S.

PERSONNEL

Harold P. Bell has been appointed manager of Buffalo Flour Mills Corp., succeeding Frank S. Birkenmeyer, who has become director of northwest sales of Commander-Larabee Milling Co.

Ira S. Brightman, executive vice-president of H. Baron & Co., Inc., Linden, N. J., was chosen president of Fruit & Syrup Manufacturers Assn. at 31st annual meeting in New York City.

Eric S. Clarke has been named president and managing director of Canada Malting Co., Toronto, Canada.

J. B. Cross, president of Calgary Brewing & Malting Co., Ltd., Calgary, Alberta, has been elected chairman of governing committee and president of Dominion Brewers Assn.

R. W. Bouskill of Winnipeg, Manitoba, has been named president of Assn. of Operative Millers of Canada.

C. L. Dressel, formerly president of Chicago Milk Div., Borden Co., Chicago, has been made chairman of company's newly-consolidated Chicago Central Div. Oliver O. Smaha succeeds him as president.

Edward T. Donohue, former secretary and general manager of Miller Brewing Co., Milwaukee, is now administrative assistant to Frank C. Verbest, president of Blatz Brewing Co.

W. G. Epstein, former director of laboratories of Doughnut Corp. of America, Inc., is now technical service representative for Mennel Milling Co. of Toledo, Ohio. His headquarters are in Baltimore.

John Koetting, chairman of board of Fehr Baking Co., Houston, Tex., has been named new chairman of American Bakers Assn. wholesale bread branch.

Deane Waldo Malott, president of University of Kansas, has been elected to board of directors of General Mills, Inc.

Roy E. Morse, formerly at University of Mass., has been appointed to faculty of University of Georgia as associate professor of food technology.

Richard L. Nagle has been appointed division manager of industrial sales for A. E. Staley Manufacturing Co. He will handle monosodium glutamate, soya flour and lecithin.

S. A. Rushin has been elected vice-president and secretary of Norris, Inc., Atlanta, Ga., candy firm. S. D. Dorsey, factory superintendent, was elected a director.

Robert Brooks Taylor has joined firm of Associated Engineers, Inc., as vice-

What In-Plant Chlorination Means To You...

Leading packers of frozen, canned and dehydrated foods all over the country have found that In-Plant Break-Point Chlorination gives these multiple advantages:

1. Removes one of the two major sources of contamination.
2. Permits making every hose connection a source of water with sterilizing properties.
3. Eliminates slime and eliminates bacteria-induced off-odors.
4. Gives you the kind of spotless plant you've always wanted.
5. Produces the basic value of a clean product packed in a clean plant.

Write today, without obligation, for data on operational experience and details on the application of In-Plant Break-Point Chlorination to your plant.

WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

favored because it's better flavored

SPICEOLATES

Better flavored because when SPICEOLATES (water soluble spice oils) are used in Catsup they break up into extremely small particles. These flavoring particles uniformly permeate the Catsup and give it a completely even, true flavor at less cost. SPICEOLATES are available either in single flavors or in combinations of spice oils.

A request on your letterhead will bring desired samples of SPICEOLATE flavors.

150 Years of Experience

D&O EST. 1798

150 Years of Progress

Dodge & Olcott, inc.

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BRANCHES: BOSTON • CHICAGO • ST. LOUIS
PHILADELPHIA • LOS ANGELES • SAN FRANCISCO
PLANT AND LABORATORIES: BAYONNE, NEW JERSEY

president and director of chemical research and consultation. He had been chief of regional products research division of TVA since 1935.

E. W. Tiedeman, general manager of Central Dairy Sales Co-Op, Appleton, Wis., has been elected president of Milk Foundation, a non-profit research organization supported by the Chicago area milk industry.

Dr. Joseph Wagner has joined staff of Quartermaster Food & Container Institute for Armed Forces in Chicago. Formerly head of nutritional research section in general laboratory of Libby, McNeill & Libby, Blue Island, Ill., he is now Chief of Fruit & Vegetable Branch, Food Development Div., of the Institute.

Emil F. Werly, former director of research for W. C. Hardesty Co., Dover, Ohio, has joined Pillsbury Mills research and products development department as a chemical engineer.

M. E. Williams, vice-president of Dawson Cotton Oil Co., Dawson, Ga., has been elected president of Georgia Cottonseed Crushers Assn. W. S. Oates, manager of Home Fertilizer & Cotton Oil Co., Headland, Ala., was elected president of Alabama-Florida Cottonseed Products Assn.

Gottlieb Zahler, who formerly operated a cheese making business in Antwerp, N. Y., has reopened business at Lacona, N. Y. Fancy Brie cheese will be his main product.

ASSOCIATED INDUSTRIES

Allis-Chalmers has named P. F. Bauer manager of newly formed central region general machinery division with headquarters in Cleveland.

Aluminum Seal Co., Richmond, Ind., has promoted Norman Olsen from sales manager to vice-president in charge of sales.

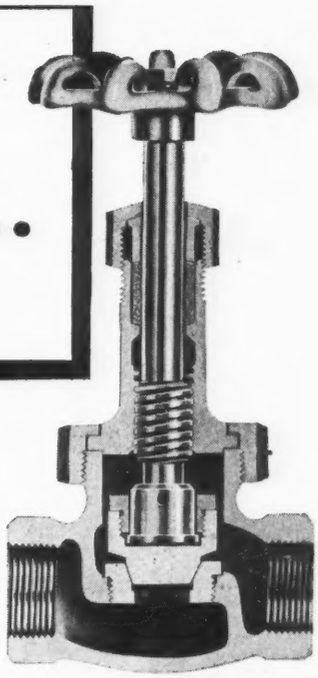
American Coating Mills, division of Owens-Illinois Glass Co., has opened a sales office in Atlanta, Ga., with Robert K. Howell, Jr., as sales manager.

Diamond Alkali Co. has appointed James C. Forsyth as manager of branch office sales, and named C. W. Turner as supervisor of dairy industrial sales.

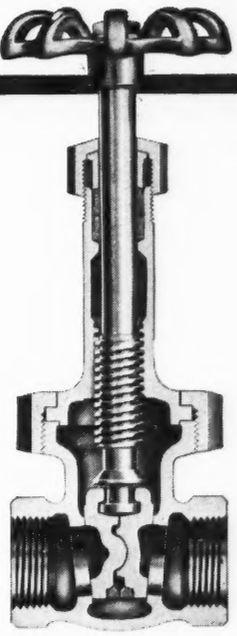
Economic Machinery Co., Worcester, Mass., at recent annual meeting of board of directors elected Howard R. Stewart as vice-president. Andrew J. B. Adams becomes general manager as well as treasurer of company.

J. W. Greer Co., Cambridge, Mass., announced sale of its wire belt division

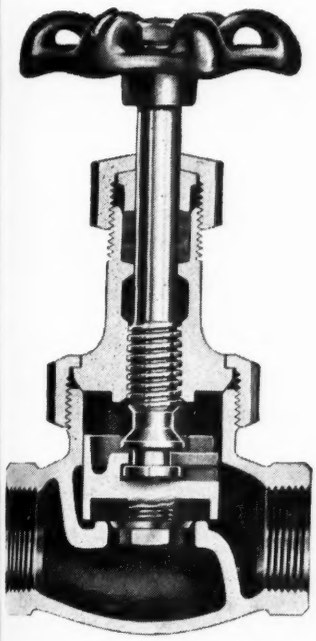
Walworth bronze valves...



Walworth No. 225P Globe Valve
500 Brinell Seat and Disc



Walworth
No. 29 Gate Valve



Walworth No. 95 Globe Valve
Re-New-Disc

built to give dependable trouble-free service on all recommended jobs

Walworth No. 95 Bronze Globe Valves (Angle Type: No. 96) are recommended for service where throttling is not required. They are rated at 150 psi working steam pressure, 500F; 300 psi cold water, oil or gas. The improved renewable disc and lock-on, slip-off disc holder — an original Walworth development—saves time and trouble. This valve can be repacked under pressure when fully opened. All parts are designed to give maximum service and strength.

Walworth No. 29 Bronze Gate Valves are rated at 200 psi working steam pressure, 550F; 400 psi cold water, oil and gas. These valves have rising stems and integral seats. Sizes 2-inch and smaller have union bonnets; sizes 2½ and 3-inch have bolted bonnets. Valves up to and including ¾-inch have solid wedge discs; 1-inch and larger have split wedge discs. These valves can be repacked under pressure when fully opened.

Walworth No. 225P Bronze Globe Valves (Angle Type: No. 227P) are rated at 350 psi working steam pressure, 550F; and 1000 psi non-shock service on cold water, oil and gas. The stainless steel, plug type seat and disc — heat treated to 500 Brinell — can be closed on sand, slag, scale and similar floatage, without injury to the seating surfaces. They are the longest wearing, TOUGHEST bronze valves you can buy.

For full information about Walworth Quality Bronze Valves, see your Walworth distributor, or write:

GLOBE

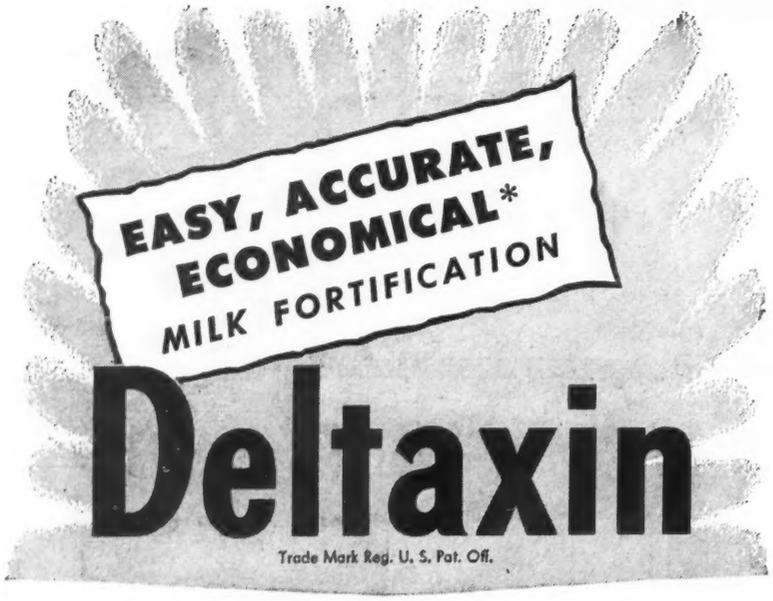
GATE

ANGLE

WALWORTH
valves and fittings
60 EAST 42nd STREET NEW YORK 17, N. Y.

CHECK

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



WINTHROP-STEARNS' BRAND OF CALCIFEROL

PURE CRYSTALLINE VITAMIN D_2

***COSTS LESS THAN ONE CENT PER 100 QUARTS OF MILK**

Use Vitamin D in its *purest, most potent form* for easy, accurate, economical fortification of fluid milk and other foods.

DELTAXIN dissolved in propylene glycol is an outstanding vitamin D concentrate with these advantages:

1. Contains purest known form of vitamin D_2 with uniform potency, not affected by pasteurization.

2. Propylene glycol as solvent insures rapid and thorough dispersion of vitamin D.

3. Simply "measure-and-add" direct to milk, saves time and money.

4. Stable, does not become rancid, does not affect color, odor or taste of milk.

5. No changes in your production set-up, no emulsifiers or extra equipment, no license or royalty fees.

The Council on Foods and Nutrition of the American Medical Association has declared Calciferol in Propylene Glycol suitable for the fortification of Council accepted vitamin D Milk.

Sold in four sizes for the convenience of small and large dairies.

SPECIAL MARKETS—INDUSTRIAL DIVISION

Winthrop-Stearns INC.

170 VARICK STREET, NEW YORK 13, N.Y.

Sole Manufacturer Under U. S. Patents 1,902,785 and 2,030,792

OTHER SPECIAL MARKETS DIVISION PRODUCTS

B-E-T-S*—The original Food-Enrichment Tablet for Bread and Macaroni Products.

VEXTRAM*—The First Starch Base Mixture for Enrichment of Flour, Corn and Macaroni Products.

OXYLITE*—An Improved Flour Bleaching Agent.

TRIDEE*—Vitamin D_3, Activated 7-dehydrocholesterol, for Vitamin D Fortification of Animal Feeds.

PURE CRYSTALLINE VITAMIN D_3—For Fortification of Evaporated Milk.

ASCORBIC ACID—To retard browning, retain flavor of Frozen Fruits.

Pure Crystalline Vitamins in Bulk

Vitamin B_1 — Niacin
Vitamin B_2 — Niacinamide
Vitamin B_6
Calcium Pantothenate

LIGNIN VANILLIN C. P. U. S. P.

ROCCAL*—powerful sanitizing agent; the *original* quaternary ammonium compound.

**Trade Marks Reg. U. S. Pat. Off.*

to Wire Belt Co. of America. Belting product had long been offered in conjunction with Greer line of confectionery and baking equipment. Wire Belt firm will produce it under new name, Flat-Flex.

Harrington & King Perforating Co. announced retirement of J. M. Fuller as president after 62 yr. of service. F. P. Hutchinson was elected as new president and J. E. Fuller became vice-president and treasurer.

J. W. Kress Box Co. will build a million dollar plant in Newark, O., for manufacture of corrugated fiber boxes and related products.

Libby-Owens Glass Co. has appointed S. M. Edwards as manager of Atlanta branch office. He succeeds R. W. Sterrett, who resigned to become president of Southern Zonolite Co.

Monsanto Chemical Co. announced appointment of G. Theodore Barks as general superintendent of company's new vinyl chloride production unit.

John I. Thompson & Co. is new name of Washington, D. C., consulting engineering firm formerly known as 921-17th Street Corp. J. Barry O'Keefe is president, while Charles J. Roggi is vice-president and chief engineer.

Union Bag & Paper Corp. has appointed R. C. Burton as director of corrugated container sales. He succeeds W. T. Sheldon, resigned.

DEATHS

James F. Darmondy, 82, founder and owner of J. F. Darmondy candy manufacturing firm of Indianapolis, at his home in that city, June 2.

Dr. Charles Hoffman, 63, director of laboratories for Ward Baking Co., New York City, at his home in Scarsdale, N. Y., May 24.

Clarence H. Neureuter, 52, president of Hasselbeck Cheese Div. of Borden Co., at Buffalo, N. Y., May 23.

Henry W. Sandberg, 52, general manager of Post Cereals Div. of General Foods Corp., suddenly at his home in Battle Creek, Mich., June 17.

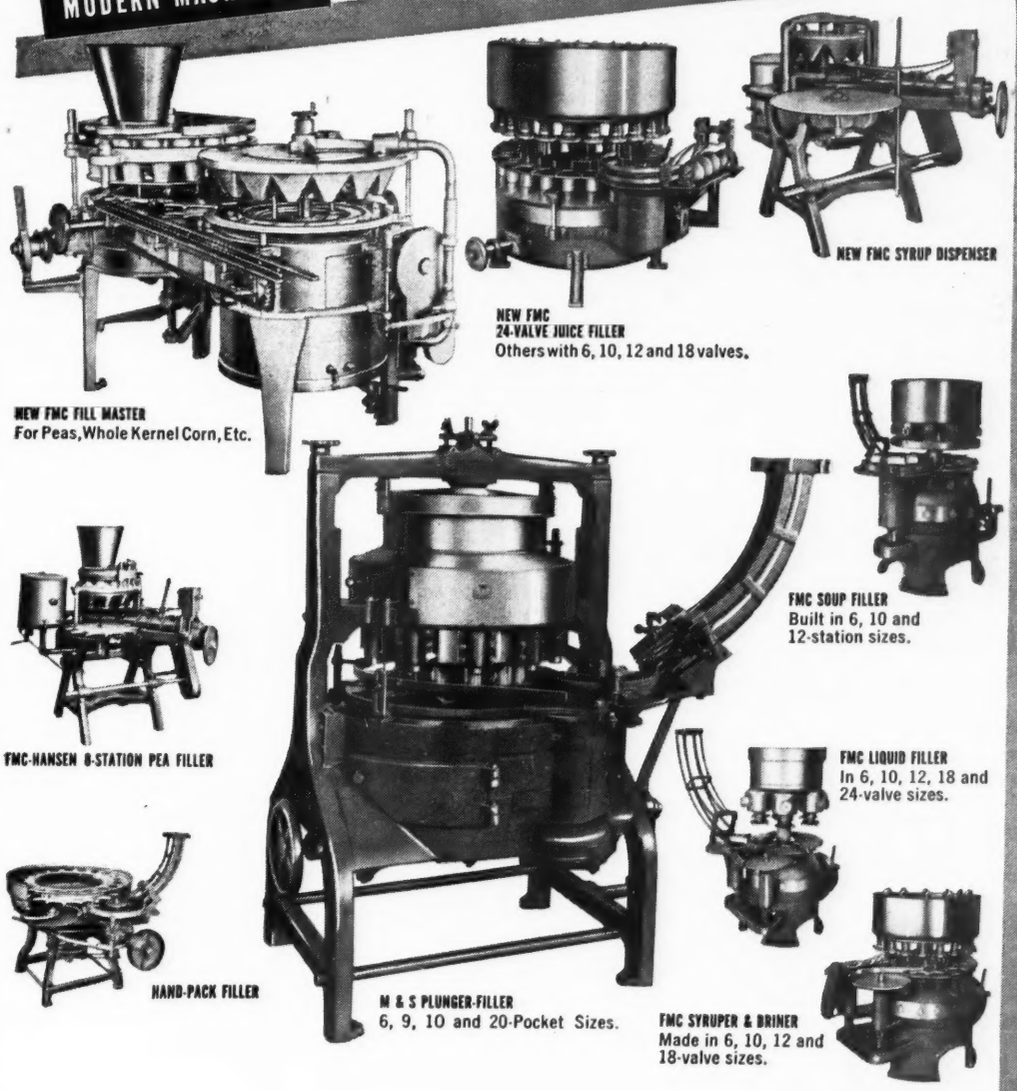
Edward A. Salter, 67, president of Salter Canning Co., North Rose, N. Y., and a past president of Assn. of N. Y. State Canners, June 9.

E. A. Throckmorton, 46, president of Container Laboratories, Inc., Chicago, suddenly in Chicago, June 7.

William Jennings Weller, 86, a pioneer in N. Y. ice cream industry, at his home in Goshen, N. Y., May 20.

FIGHT MOUNTING COSTS with FMC MODERN MACHINERY

FASTER, BETTER, LOWER-COST FILLING



NEW FMC SYRUP DISPENSER

NEW FMC
24-VALVE JUICE FILLER
Others with 6, 10, 12 and 18 valves.

NEW FMC FILL MASTER
For Peas, Whole Kernel Corn, Etc.

FMC SOUP FILLER
Built in 6, 10 and 12-station sizes.

FMC-HANSEN 8-STATION PEA FILLER

FMC LIQUID FILLER
In 6, 10, 12, 18 and 24-valve sizes.

HAND-PACK FILLER

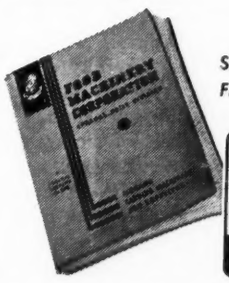
M & S PLUNGER-FILLER
6, 9, 10 and 20-Pocket Sizes.

FMC SYRUPER & BRINER
Made in 6, 10, 12 and 18-valve sizes.

FMC offers you the most complete and dependable line of filling machines on the market—speedy, cost-cutting fillers for practically all products . . . for filling containers of practically every size and type—to meet a great variety of standard and special filling conditions.

Canners and Packers, large and small, use more and more FMC Fillers each succeeding year.

Write us about any filling job you have. Even if it's "tricky" or difficult, FMC "know-how" will work it out for you.



SEND FOR 260-page free CATALOG showing the complete FMC line of processing, canning and packaging machinery.

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With FMC's Complete Line of Filling Machines For Any Products from Soup to Nuts—and A to Z

All these products and many more can be filled on FMC Fillers.

A
Apples
Apple Sauce
Alcohol
Anti-Freeze
Asparagus, Cut

B
Baby Foods
Beans, All Kinds
Beets
Berries
Brine
Butter

C
Cheese
Chili Con Carne
Chili Sauce
Chips, Potato
Cocoanut
Corn, Cream Style
Corn, Whole Kernel
Cut String Beans

F
Fish Flakes
Fish Paste
Frozen Foods
Fruit
Fruit Butter
Fruit Cake
Fruits, Crushed

G
Grease

H
Hash
Hominy

I
Ice Cream

J
Jams
Jellies
Juices, All Kinds

K
Kraut

L
Lard
Liquids, All Kinds
Loaf, Veal

M
Macaroni
Marmalade
Marshmallow
Mayonnaise
Meat Products
Meats, Potted
Milk, Condensed
Milk, Evaporated
Mince Meat
Molasses
Mushrooms

N
Nuts

O
Oils
Oil, Olive
Oil, Salad
Olives

P
Paint
Paste
Peaches
Pears
Peas
Pet Foods
Pickles
Pineapple
Plums
Popcorn
Pork & Beans
Potatoes, Julienne
Potato Salad
Preserves
Prunes
Puddings
Pulp
Pumpkin
Purees

R
Relishes

S
Sauce
Shortening
Solvents
Soups
Special Products
Spinach
Succotash
Syrup

T
Tomatoes

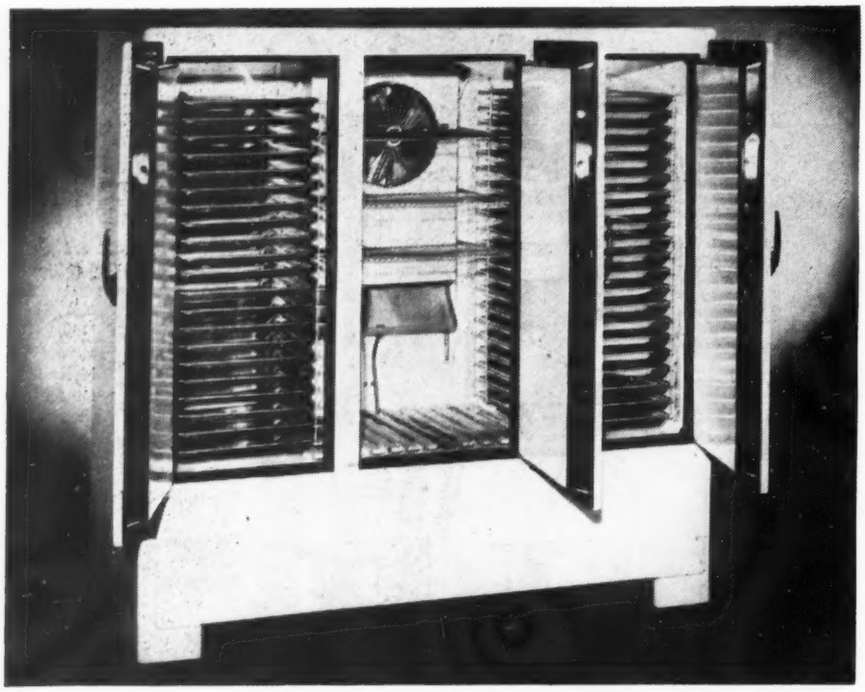
V
Vegetables, Diced
Vegetables, Mixed
Vegetables, Sliced

W
Welsh Rarebit

Z
Zwieback

—and many other products. If you don't find your product in this list, write FMC about your filling problem.

FOOD EQUIPMENT NEWS



Baker's 48-Cu. Ft. Dough Retarder 1

To improve the quality of baked goods as well as reduce inventory losses due to stale dough, a new 48 cu. ft. bakery refrigerator for dough retarding is announced by the Frigidaire Division, General Motors Corp., Dept. I, Dayton 1, Ohio.

Divided into three separate compartments, unit has space for 42 standard bakery trays. Two of the three 16 cu. ft. compartments are used to hold trays, while the third is left free for bulk storage of yeast, eggs, cream, milk and similar baking materials.

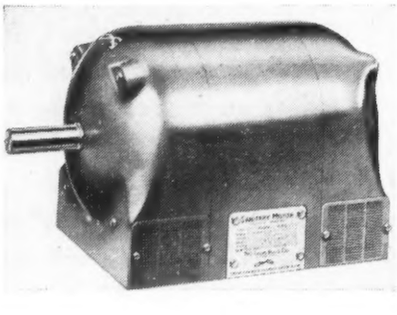
All interior surfaces are finished in white lifetime porcelain. The sturdy bar-type tray racks, made of hot galvanized rust-resistant steel, permit quick, easy, tray insertion and removal. There is efficient forced air cooling by a compact cooling unit mounted against the back wall of the liner. Unit occupies a minimum of usable space and circulates clean, cool, moist air to all parts of the storage area. No manual defrosting is necessary.

The white Dulux-finished cabinet is built of heavy gage steel with welded overlap joints sealed to keep out moisture. Fibrous glass, 3-in. thick in all walls, top, bottom, and doors, forms an insulation that is vermin-proof, will not settle, deteriorate, or absorb moisture. Vertical easy-action door handles are equipped with padlock rings. Net weight is 860 lb.

Sanitary Motors 2

For use in dairies, food processing, canning and beverage plants, new sanitary motors are now offered by the Louis Allis Co., Dept. I, Milwaukee. The units are streamlined and free of any cracks, recesses or depressions where milk or food products can collect. Smaller-rating models are supplied in totally enclosed, non-ventilated construction which prevents entrance of vermin when motor is shut down for the day. Larger ratings are splash-proof and will be supplied with removable stainless steel grille plates over the cooling air inlets and outlets. All sizes can be washed to insure maximum sanitation.

In this new design, entire base is enclosed by the motor housing, which is finished to a flat surface. This prevents collection of milk or food particles under the motor. Mounting bolt holes are located in accordance with NEMA standards, permitting ready change with motors now in use. Access to the mounting bolts is through the removable grille plates.

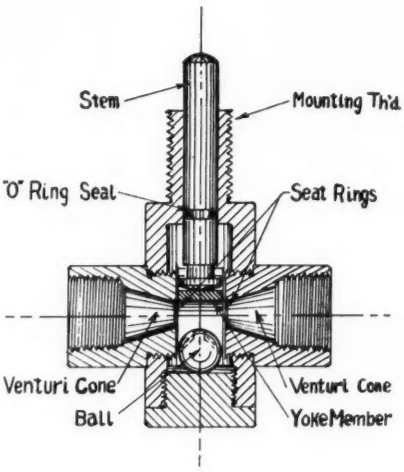


The motors are being supplied with the Type C flange for pump applications and with all standard and special voltages, frequencies and electrical modifications that may be required. Planned is a deluxe model of this motor using non-corrosive Dairy Metal or Waukesha finish.

Automatic Valve 3

Newly announced is a straight-through automatic valve which opens with very light push on stem. Maker is Paul Valve Corp., Dept. I, New York. Unit's light actuating force means quicker valve opening and longer cam life. It permits design of lighter operating mechanisms. Actuation can be by cam, lever, solenoid or diaphragm.

With only two moving parts and no springs, valve utilizes Bernoulli Theorem to force a precision ball into low-pressure center of stream and hence into seat. Body of valve is machined to shape of a venturi tube. Valve automatically closes whenever fluid flows through venturi. To open valve, stem and yoke push ball down, rolling it out of seat and down into a recess. Yoke is shaped like an inverted "U" straddling the stream, so that when valve is open there is no restriction to straight-line flow. Practically all the energy of the stream is recovered in the venturi tube design. Current standard sizes are ½ in., ¾ in. and 1 in., with standard NPT pipe thread connections suitable for pressures up to 125 lb. psi.



Chain Hoist Trolley 4

Improved chain hoist trolley for use on I-beam overhead conveyor installations is offered by Saginaw Products Corp., Dept. I, Saginaw, Mich. Wheels are fabricated of heavy strip steel, carefully carburized and hardened. Grease-seal wheel design holds lubricant while excluding all dust and grit. Two halves of trolley are adjustable to permit mounting at any point on I-beam, while spacing washers insure exact adjustment on I-beams from 3 to 18 in.

Stainless Steel Piping 5

JOINTING of lightwall stainless steel piping and fittings by a new method is expected to increase the use of these piping systems in food processing and other types of industrial plants. Developer of the new system is H. K. Ferguson Co., Dept. I, New York City, industrial engineering and building firm. The first installation is now being made in a large midwestern corn processing mill.

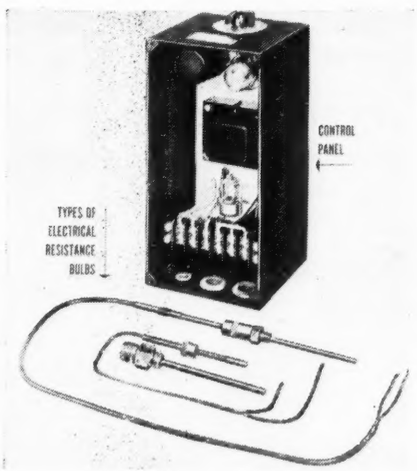
The new method avoids the necessity of welded joints and fittings by combining new type lightwall stainless steel Vanstone-end fittings with lightwall stainless steel tubing that can be cold-Vanstoned in the field. The two members of the system—fittings and piping—are bolted together with carbon steel split-type backup flanges.

Arrangements have been made for the production of the fittings in 125-lb. pattern dimensions. Only requirement is to cold-Vanstone the tubing in the field, and company engineers have developed a portable machine for this purpose.

Temperature Controller 6

NEW UNIT for control of temperatures, stated to be simple, fast and precise, has been developed by the Instrument Division of Thomas A. Edison, Inc., Dept. I, West Orange, N. J. Device uses a single electronic tube with an electrical resistance type bulb for thermal pick-up. It is of the on-off type.

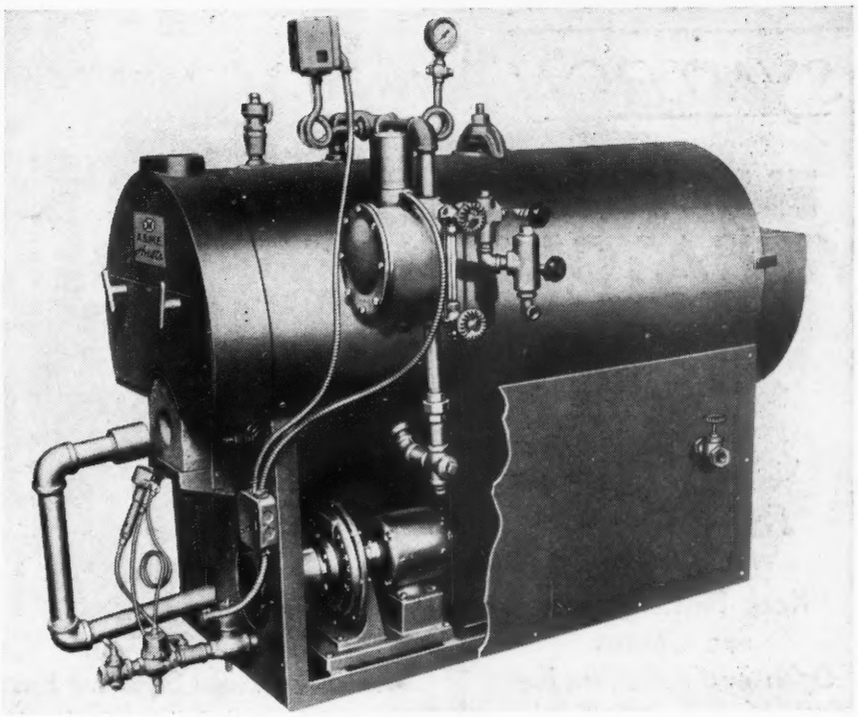
Use of the resistance bulb permits location of the sensing element for remote control and avoids the need for thermal



compensation. This device is non-indicating. It may be used to control temperatures to close tolerances in solids, gases or liquids. Available to cover the temperature range from —100 deg. F. to +1200 deg. F., the units are adjustable within a range of several hundred degrees.

Supply voltage may be 115 or 230v., 50-60 cycle a.c. Load capacity is 30 amp. at 115v., 20 amp. at 230-v. Accuracy of controller is independent of usual voltage variation. Normal response time is reported under 3 sec., due to the patented bulb construction.

The 5 in. x 5 in. x 10 in. control panel, weighing less than 8 lb., complete is provided with conduit knockouts and a rugged terminal board.



Packaged Portable Automatic Steam Boiler 7

COMPLETE, packaged-unit steam boiler that furnishes full volume, automatically controlled low pressure steam, even when boiler is operating wide open at peak load capacity, is announced by Anetsberger Brothers, Inc., Dept. I, Northbrook, Ill. This boiler can be furnished in either gas or oil fired models.

The unit comes fully equipped with all automatic and safety controls. It develops 7 hp. at 15 psi. maximum pressure. Small, compact and powerful, boiler occupies a space 72 in. long by 35 in. wide and 52½ in. high. It is easily portable, and only need is to hook up electric, gas and water lines.

In type, boiler is a Scotch marine dry back fire tube with two passes. There are three convenient hand-hole clean outs. Boiler can be used in pasteurizing, sterilizing, processing, baking, proofing, laboratory work, and general heating.

Gas operated type comes furnished with Maxon premix pressure gas burner, low water safety shut-off pilotstat, Pressuretrol, Magnetrol, solenoid valves, 1/10 hp. 11 v. blower motor, 1-in 15-lb valve, steam pressure, and water feeder, all as standard equipment. Boiler is constructed under ASME code of certified boiler steels; test and inspection by Hartford Steam Boiler Inspection & Insurance Co.

New Grain Fumigant 8

FARMERS and millers are now offered a new grain fumigant that promises to save millions of bushels of stored grain from grain weevils, cadelles, and other insects.

Known as Dowfume EB-5, the new product contains 5 percent by volume of ethylene dibromide in chlorinated solvent. Combination of excellent penetrating qualities with high toxicity is stated to make the mixture ideal for controlling pests in all levels of the bin. It is pointed out that ethylene dibromide will kill more than 50 different species of grain pests.

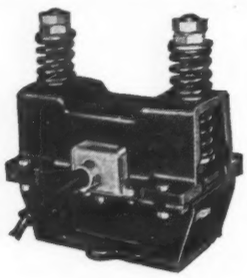
The chemical is applied to bins by spraying the leveled surface evenly through a length of ¼ in. pipe. Both hand and power sprayers may be used effectively. Bins should be tightly closed after fumigation for at least a week.

It is stated that the fumigant, when properly applied, does not harm grain, neither impairing its germinating qualities, nor affecting its baking qualities. It does not impart odor or taste.

WRITE FOR MORE INFORMATION

Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials. Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.

SYNTRON
"Pulsating Magnet"
ELECTRIC VIBRATORS



Keep Bins, Hoppers and Chutes Open and Free-Flowing

Banged-up and dented bins and hoppers cost money in replacement and in man hours lost—and that's where SYNTRON Vibrators come in. They eliminate the arching and plugging that takes a man's time to pound, and damage, those bins and hoppers.

What they are — pulsating electromagnets that produce 3600 vibrations per minute from 110, 220 or 440 volt, 60 cycle A.C. There are no cams, gears or eccentrics—merely electromagnetic reciprocation from half-wave rectified current.

Where can they be applied —to any size and shape of bin, hopper and chute—whether made of steel, wood or concrete. Handling dry or damp bulk food products, etc.

How are they applied—thickness or gauge of hopper wall is the most important factor. However, overall dimensions, cubic content, degree of fineness and moisture content of material must also be considered.

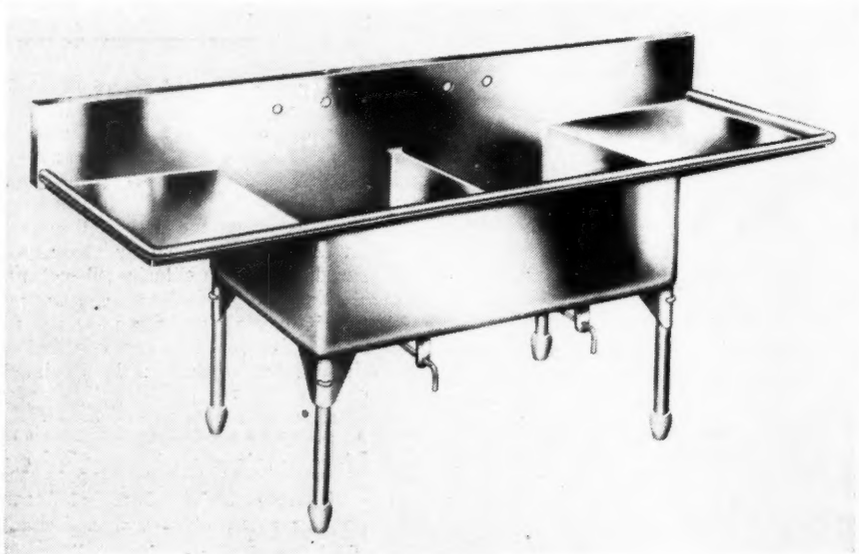
Write —giving the details of your troublesome bin, hopper or chute — our Engineering Department will be glad to give you their recommendations.

SYNTRON CO.
460 Lexington, Homer City, Pa.

Improved Heat Sealing Packaging Equipment 9

A NEW "Master Series" Speedsealer, designed for heat-sealing bags, and pouches of cellophane, pliofilm, foil, and similar materials at 400 inches per minute has been announced by the Pack-Rite Machines, Dept. I, Milwaukee 1, Wis. Among the improvements is the safety-locking slide-type adjustment. It insures uniform sealing pressure over the full surface of the crimping rolls, at whatever pressure setting is used. A spring release eliminates all possibility of gear damage should foreign particles come between the crimping surfaces. Accurate temperature control, longer heater life, and positive temperature indication are provided in the improved heater mounting and new type thermostat. The operator sets the dial on the front of the machine for the desired heat-sealing temperature, and a pilot light immediately above the dial automatically indicates when the machine is ready for operation. The sealing rolls are made of aluminum bronze. Working parts are enclosed in a one-piece cast aluminum frame. The parts are easily accessible by turning a single knob and removing the cast-aluminum cover.

All bearings on the machine are of the graphited bronze type.



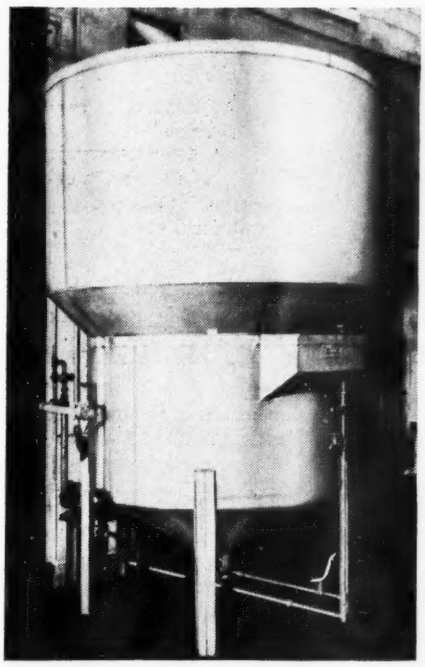
Heavy-Duty Stainless Steel Sinks 10

ROUND-CORNER, welded stainless steel sinks in 16 standard sizes are announced by S. Blickman, Inc., Dept. I, Weehawken, N. J. Known as "Value Line," they are available with one, two or three compartments. The gage used is No. 14 (.078 in. thick), which provides for heavy-duty service and long life. Feature of the sinks is the patented lever-handle waste outlet which has an externally-operated, stainless steel handle to open or shut the valve. This avoids the need for reaching through the contents of the sink to get at the drain.

Brine-Making Tank 11

DEVELOPED by the International Salt Co., Inc., Dept. I, Scranton, Pa., Lixator-brine-making tank is available in a variety of sizes that meet the brine requirements of any plant. Unit consists of a rock salt storage hopper over a dissolving tank with a brine collection chamber. Rock salt flows by gravity from hopper into tank beneath, until tank is completely filled. Water enters this tank near top and dissolves rock salt as it flows downward.

About half way down, water becomes



fully saturated brine, then remainder of rock salt in tank acts as a filter bed that removes all insoluable matter from brine. When brine reaches the collection chamber, it is both saturated and crystal clear.

Bronze Plug Valve 12

Now produced by Ampco Metal, Inc., Dept. I, Milwaukee, is a corrosion-resistant, all-bronze plug valve. This aluminum bronze valve is designed primarily for breweries and the process industries. It may be furnished with any type connection—flanged, threaded male or female, or hose coupling thread. Provision is made for pipe connections for flow meter, gage, by-pass clean out, and gas injector on the 2-in. size. The 3-in. valve can be furnished three-way or two-way, as desired. Sizes are ½ in. to 4 in. Optional is a metal protected Pyrex sight glass which permits easy inspection of the flow of the fluid.

Dial-Thermometer 13

MANUFACTURED in watch-like pocket size, a new dial thermometer has been announced by the Jas. P. Marsh Corp., Dept. I, Skokie, Ill. Instrument measures 2 3/16 in. in diameter, and it is produced in a polished case of durable, heavy-gage stainless steel. Swivel spring clip holds thermometer in the pocket when not in use, or serves as a hanger when taking temperatures.

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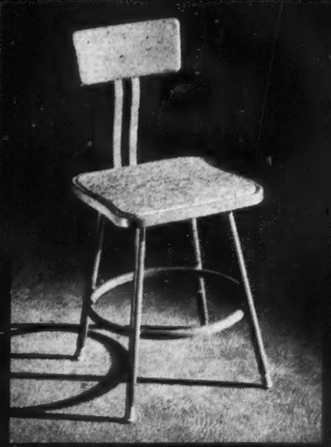

New and exclusive "QUALITY INSURANCE" Policy guarantees you FREE maintenance for 10 years against breakage and coming apart on the metal construction of Royal Industrial Seating. The same policy also includes any necessary refinishing and re-upholstering at a minimum price. Royal chairs and stools are the finest industrial seating available --- superior in function and construction --- satisfactorily designed to reduce fatigue.

Shown is Model No. 515. All welded tubular steel construction. Telescopic leg adjustment. Adjustable, large size backrest. Shaped, tempered masonit seat.

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A TIRED WORKER COSTS MUCH MORE THAN A GOOD CHAIR

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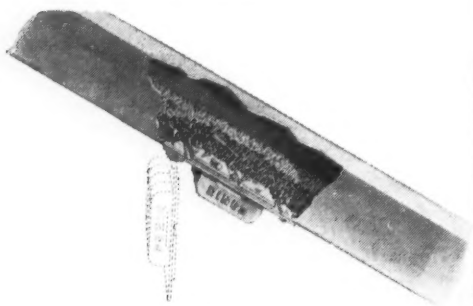
Perma-Plate Magnet

CAN DO FOR YOU!

Select the place where you want to try out Dings Perma-Plate Magnet. Let us know the applicable width and the depth of material burden. If above a conveyor, give belt speed. *We will send you the proper type and size Perma-Plate Magnet,* CARRIER CHARGES PREPAID. If it is not fully satisfactory . . . does not give constant, positive magnetic protection to your products and processing equipment . . . SEND IT BACK!



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PRICES ARE AS LOW AS $21 FOR THE 4" WIDTH!

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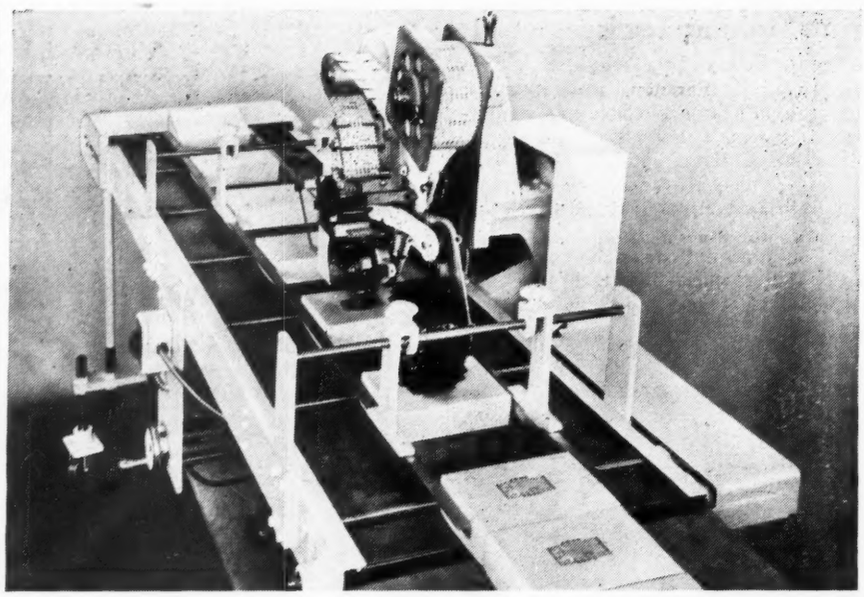
Dings "HIGH INTENSITY" Since 1899



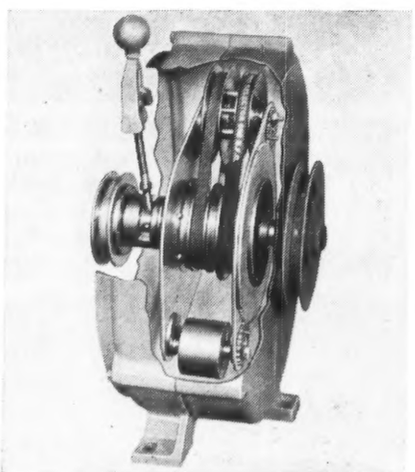
Portable Power-Driven Print Labeler 14

NEWLY developed by the Package Machinery Co., Dept. I, Springfield, Mass., is the Thermo-Print-Labeler, termed a versatile unit for many labeling needs.

Using die-cut labels in roll form, unit automatically cuts each label, imprints it with price, date, code, or other information, applies heat to activate the thermoplastic coating. Label is sealed firmly in the position desired—a circular brush passing over the label, assuring a tight, lasting seal, even on an irregular surface. It is stated labels will adhere to virtually any type of surface—paper, cellophane, wood, metal, textiles, and glass.

Speed of labeling depends on the character of the product, reports the maker, and will vary between 20 and 60 pieces per min. Speed can be adjusted by turning a hand-wheel.

The ample dimensions of the infeed conveyor accommodate products 3 in. to 18 in. long, 2 in. to 10 in. wide, and 1 in. to 6 in. high. Size of the label may vary within the following range: 2 to 2¾ in. wide, and 1½ to 2¾ in. high. Printed message itself may vary in size up to a maximum of 2¼ in. wide by ½ in. high. It can be quickly changed by inserting a new printing plate.



Speed-Selector Drive 15

A NEW 5 hp. model speed control having unlimited ratios is announced by Speed Selector, Inc., Dept. I, Cleveland 13. This variable speed drive is stated to utilize a new principle of planetary motion applied to speed changers in combination with standard V-belts and variable pitch sheaves, making possible infinite ratio, split-second control of speeds from 0 to 800 rpm., and also reverse action where needed. Its design omits gear shifts, clutches, multi-speed motors, and step pulleys required in many designs.

Sturdy in construction, the units have cast iron sheaves on hardened and ground shafts and guide pins with sealed, prelubricated ball bearings, mounted in strong yet light cast-aluminum housings. Optional V-belt or flexible coupling input and output make the unit easily adaptable for various mounting on new or existing equipment.

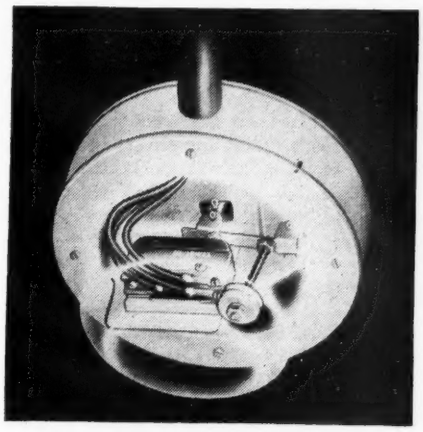
Insulating Material 16

PLASTIC FOAM insulating material, combining low thermal conductivity with very light weight, is now being produced by United States Rubber Co., Dept. I, New York, N. Y., for low temperature installations. Advantages of material, called U. S. Flotofoam, are that it is non-corrosive, non-toxic and self-extinguishing. It will not support mold or bacteria growth, and it holds its insulating value over a wide range of mean temperatures. The snow white plastic foam is available in shredded or block form. Shredded form weighs from .8 to 1 lb./cu. ft.; block form from .8 to 1.5 lb./cu. ft. Blocks and slabs can be produced in a variety of sizes and shapes to fill cavities. Surfacing may be paper, cloth or resin coatings. Shredded form, which is easy to pour and pack into irregular cavities, can also be supplied in individual containers, ready for installa-

tion. Material is over 99 percent air and less than 1 percent solid. Thermal conductivity or K value of shredded form is 0.173 to 0.208 Btu./hr./ft.²/°F./in. over a range of mean temperatures from 9° F. to 100° F. Thermal conductivity of block form is from 0.20 to 0.23.

Material-Feed Control 17

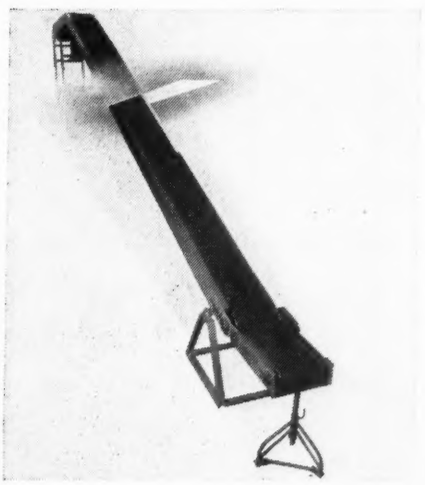
ANNOUNCED by the Bin-Dicator Co., Dept. I, Detroit 15, Mich., is a new, smaller material-feed control unit called the Bantam. It is designed for use on very small hoppers, spouts, chutes, conveyors, and other applications where it is not possible to use the standard unit because of its size. The unit is 5¾ in. overall



diameter. These controls are diaphragm-operated switches in sealed housings which are mounted on the outside of bins, hoppers, screw conveyors to signal changes in material levels. They will automatically start and stop filling and emptying equipment as the level of material reaches designated limits.

Floor-to-Floor Conveyor 18

INCLINED floor-to-floor conveyors are announced by Sage Equipment Co., Dept. I, Buffalo 13, N. Y. They are of slider-bed type construction, and have nosed-over delivery and power-driven tail feeder.



Standard units are built with 8 in.-to-24 in. wide, 3-ply, 28-oz. duck ruff-top rubber-covered belt. Conveyor is furnished complete with gear head motor and 25 ft. of rubber covered cord.

Stop Losses from Insects

...Use the "ENTOLETER" Continuous Control System for Plant and Product Cleanliness

Operating records prove that "ENTOLETER" Continuous Control destroys all forms of insect life. In addition to this service, mills and food plants are reaping other benefits from the "ENTOLETER" system. Here are three positive advantages.

1 KILLS ALL INSECT LIFE

Now, more than ever, your plant and products need the "ENTOLETER" system of continuous insect control. It helps you to avoid waste of scarce food materials . . . to protect product ingredients . . . to insure the high standards of your products.

2 ESSENTIAL IN FRAGMENT CONTROL

The "ENTOLETER" system is being used successfully to reduce fragment count. Send for a copy of our latest bulletin describing methods of application.

3 AIDS PRODUCT UNIFORMITY

Food plants and flour mills have found that the "ENTOLETER" system offers an excellent means of blending flours, mixing ingredients in compounds and improving vitamin distribution. This, alone, more than justifies its cost.

For New Bulletin on "ENTOLETER" Continuous Insect Control System, write to ENTOLETER DIVISION, The Safety Car Heating and Lighting Co., Inc., P. O. Box 904, New Haven 4, Connecticut.

ENTOLETER
CENTRIFUGAL MACHINES
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CONTINUOUS INSECT CONTROL SYSTEM

If it's a superior flavor for food, it's a

FLORASYNTH

flavor for food.

MUSTARD

is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

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is a superior Florasynth food flavor.

Florasynthetic Spice Oils are Accurate ... Available ... Effective ... Synthetics long recognized as primary essentials in the manufacture of countless successful food products.

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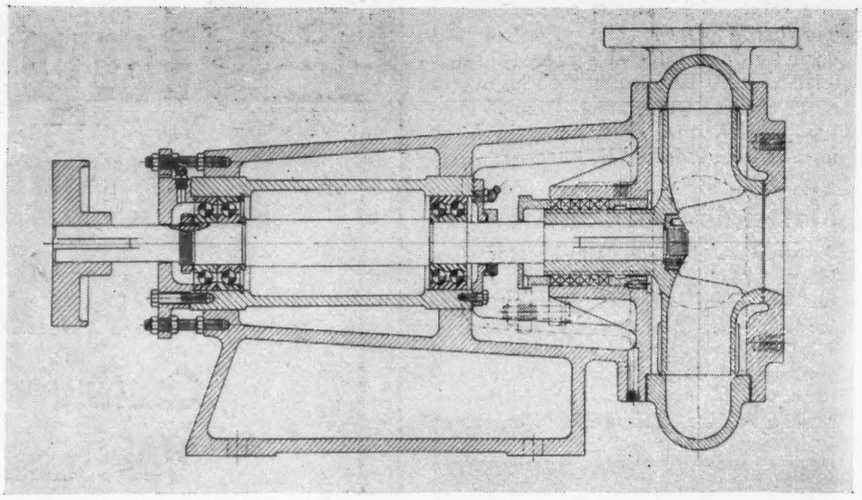
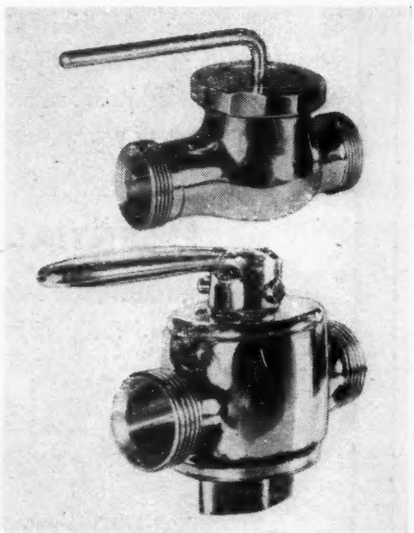


Small Non-Clog Sewage Pulp Pump 19

REDESIGNED and improved, small non-clog sewage pump is announced by Economy Pumps, Inc., Dept. I, Hamilton, Ohio. It is primarily intended for pumping of miscellaneous pulps, sewage or trash. Shaft and bearings of the new pump have been increased in size, and incorporated is a two-row, heavy-duty ball bearing unit with matched angular-contact thrust bearings. Both radial and thrust bearings are enclosed in a sub-assembly cartridge to enable quick replacement of rotating element. Thus, removal of rotor does not expose bearings to dirt and does not affect adjustment of bearings. All bearings are grease lubricated.



Sanitary Valves 20

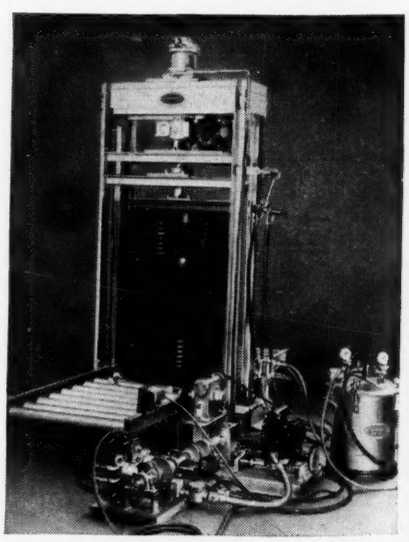
TWO TYPES of stainless steel valves for use in dairy, food and beverage industries, or wherever a high degree of sanitation is required, have been designed by Tri-Clover Machine Co., Dept. I, Kenosha, Wis. The first is a lift-type plug valve designed to overcome the problems of leakage and difficult operation. Valve plug is "cracked" open when plug is unseated by pressure of handle working against a circular spring plate under valve body. Constant holding pressure of spring plate prevents leakage by keeping valve securely seated at all times. Both types of valves are being produced in stainless steel, in 1 in. 1½ in. and 2 in. sizes.

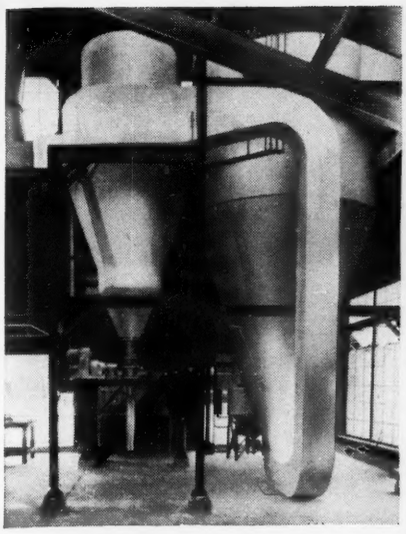
The second unit, an eccentric valve, incorporates new operating principle stated by the manufacturer to eliminate the possibility of seizing and galling while being opened or closed. This quick operating, in-the-line valve is seen at top in accompanying photo, while lift-type valve is pictured below it.

Spray-Painting Chimes 21

AUTOMATIC spray unit for painting steel barrel chimes has been introduced by Eclipse Air Brush Co., Dept. I, Newark 7, N. J. This new equipment for steel barrel maintenance was designed to improve upon former manual and semi-automatic chime painting methods. With it, painting can be stepped up to more than 400 barrels an hour.

The unit incorporates two of the company's GAT guns, mounted in position for painting the chimes or for striping. Entire procedure is automatic, including positioning of barrels, spraying, and discharge of the finished job.



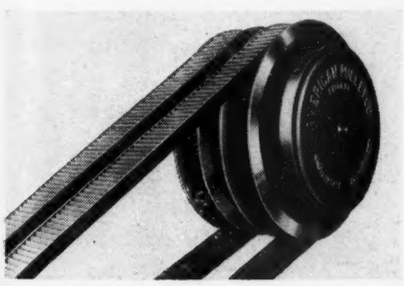


Automatic Spray Drier 22

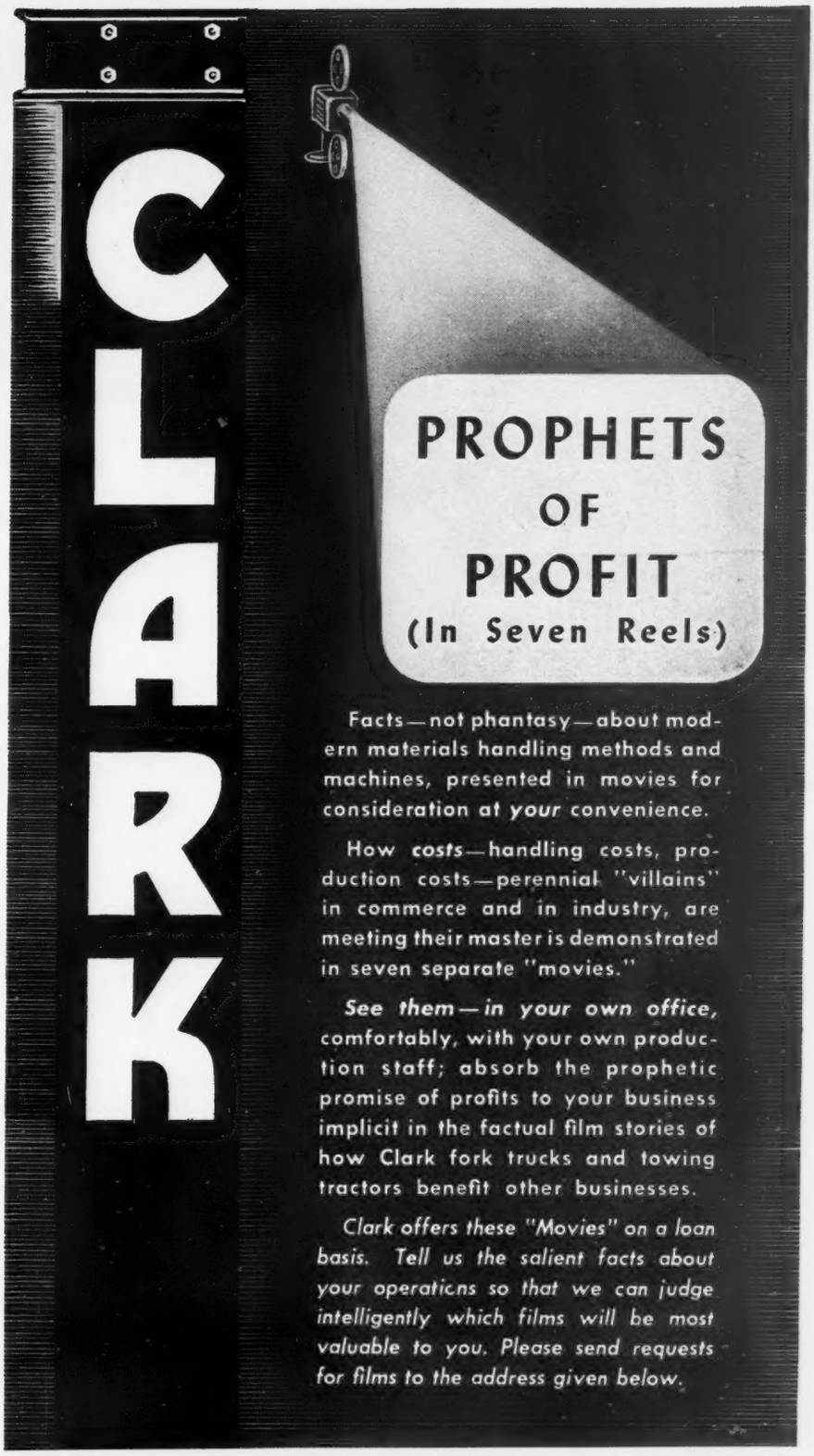
FROM Bowen Engineering, Inc., Dept. I, Garwood, N. J., comes announcement of a spray drier for production of five to ten tons of finished product per day. It is furnished as a complete operable unit requiring a minimum amount of field erection. Complete instrumentation and safety controls are provided for fully automatic operation. Salient features are ease of adjustment and flexibility of operation. All instruments and controls are located on a convenient terminal board from which complete operating data can be obtained. Drier is available in mild or stainless steel construction with direct or indirect heaters, single or multiple-stage dry collection and wet collection, and with various types of atomizers designed to produce a final product where the individual particle characteristics meet the customer's specifications.

Adjustable-Sheave 23

THE PROBLEM of frozen adjusting mechanisms in drives is reported avoided with wide-range, adjustable-diameter drive, developed by the American Pulley Co., Philadelphia. Incorporated is a new sheave



enabling adjustment at any time, construction feature being a rubber-legged hub upon which the sheave flanges are mounted. Bonded to the steel hub of the sheave, the rubber section precludes freezing by acting as an insulating cushion between flanges and sheave hub. The sheaves are made in two and three grooves with pitch diameter variation of 5.25 in. to 10.0 in. Adjustment for speed variation is made while the drive is stationary. Drives are designed to utilize multiple "R" section V-belts.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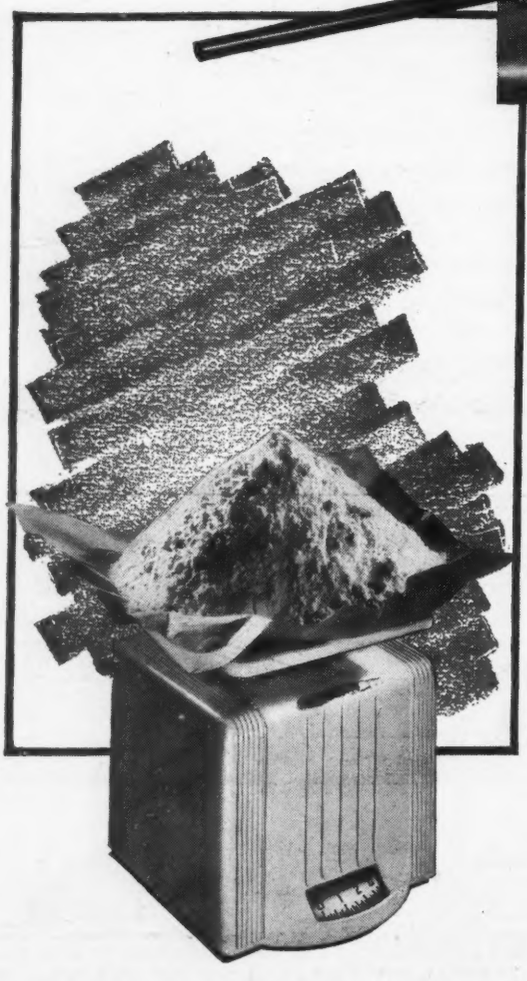
would you prefer?



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. . . A $1000 Duck Gun or a pound of any one of UPACO'S Adhesives

To any industrial marksman . . . with his sights set on higher profits . . . the answer is obvious! For he recognizes UPACO as a many-count leader and selects this quality line for his particular adhesive needs.

Like Daniel Boone . . . UPACO was, and continues to be, a pioneer. But unlike Boone, UPACO never found gun-totin' necessary to win public favor for its complete line of adhesives. Specific examples of this pioneering spirit are the roles UPACO has played in the development of synthetic resin adhesives for cellulose films, foils, polyethylene, pliofilm and countless other surfaces that have become an important part of today's packaging requirements. And as future adhering problems present themselves, Union Paste will continue its research to develop the right adhesive to meet these new demands.

Drop us a line on your adhesive problems and we're willing to wager we'll hit the bull's eye.

THE UNION PASTE COMPANY
1605 HYDE PARK AVENUE HYDE PARK, MASS.

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

FOOD PLANT EQUIPMENT

Industrial Processing Ovens 1

Gehnrich & Gehnrich, Inc.—32-page manual, "How to Select the Right Oven for your Process," discusses the four basically different oven-heating systems, employing seven types of ovens and heaters. Considered are questions of when to use which; different heating media; temperature and safety control; insulation; and material-handling. Illustrations include drawings, diagrams and photographs, and there are oven-selection tables and numerous definitions and listings.

Labeler 2

Economic Machinery Co.—4-page bulletin covers "Bee-Line" labelers. Equipment is pictured and described in detail. Specifications are given for container size range, label size, motors, and conveyors. Floor plan dimensions and sections are shown for various models.

Packaging Equipment 3

Triangle Package Machinery Co.—6-page fold-out describes and illustrates packaging equipment for dry type materials. Detail sketch shows functioning parts of equipment. Capacities are given for various models.

Magnetic Separators 4

Dings Magnetic Separator Co.—Data sheet incorporates special features, typical applications, and table of dimensions and capacities covering new Alnico Perma-Pulley magnetic separator. These new non-electric pulley type units are designed to automatically separate magnetic and non-magnetic dry materials.

Metal Detectors 5

Allis-Chalmers—1-page pamphlet shows "electronic watchdog" in operation, covering four conveyor lines. Unit will detect any metal in package, magnetic or non-magnetic.

Cartoning Machines 6

A. H. Ross Co. Inc.—4-page folder illustrates and describes many pertinent features of Ross automatic and semi-automatic cartoning machines.

After Coolers 7

Worthington Pump & Machinery Corp.—8 page Bulletin L-802-B2 on after-coolers for air and gas. Equipment is illustrated, and dimension tables and moisture chart for air under pressure are also shown.

Coolers and Exhaust Boxes 8

Barry-Wehmiller Mach. Co.—9-page Bulletin 89, "Vortex," on coolers, exhaust boxes and pasteurizers. Equipment is described and illustrated. Schematic diagrams show operating procedure of a single machine for three different processes. Machinery details and capacities are listed.

Comminuting Machine 9

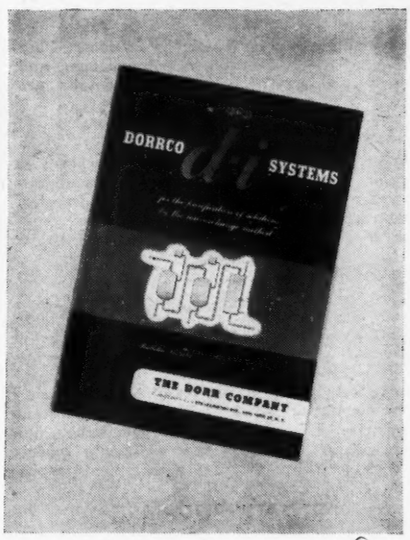
The W. J. Fitzpatrick Co.—4-page Bulletin illustrates and describes "Model D" comminuting machine. Materials of construction, screen, motor and bearing specifications are given. Wide range of applications are listed.

Single-Stage Centrifugal Pump 10

De Laval Steam Turbine Co.'s single-stage pumps have been included in single comprehensive Catalog 83-29, presenting outstanding features of design and construction of units. Listing pump ratings and incorporating essential dimensions, this catalog enables engineers to select required pump, estimate motor size, and plan installation dimensions.

Ion-Exchange Equipment 11

The Dorr Co.—24-page Bulletin 4081, three-color publication, traces development of deionization (d-i) technics from early use of



natural green-sands up to present practice. Described is Dorr equipment and services now commercially available for all types of ion-exchange work.

Centrifugal Pumps 12

Nagle Pumps.—36-page Bulletin 4711 presents most recent developments in this firm's line of horizontal and vertical shaft centrifugal pumps. Design features and materials of construction are described.

Bronze Pump 13

Ampco Metal, Inc.—Bulletin 85 covers company's centrifugal pump made from corrosion-resistant aluminum bronze and designed for wide range of services where corrosive liquids must be moved. Photos, diagrams and charts show representative characteristics of two pump sizes, and information is given concerning design features, construction and drives.

Steam Turbines 14

Worthington Pump & Machinery Corp.—24-page Bulletin 1961 covers company's multi-stage steam turbine, lists uses, types of designs available, and pressures, intake and exhaust. Component parts of turbines are illustrated and described.

Electric Hoists 15

Lisbon Hoist & Crane Co.—6-page catalog covers features of "Bob Cat" electric cranes, with component parts detailed and illustrated. Capacities range from ½ to 5 tons. Prices are given.

Marking Machines 16

Adolph Gottscho, Inc.—8-page catalog describes and illustrates 18 different marking and code-dating machines. Machines, several of which are new models, are used for imprinting, indenting, embossing, etching and hot-stamping all kinds of containers, labels, parts and products, and sheet rolls. Most are automatic and designed to fit into conventional production-line operation.

Packaging Machinery 17

Stokes & Smith Co.—4-page illustrated folder considers various models of company's automatic packaging machinery. Types of materials handled, package sizes, and production rates are given.

Heat Exchanger 18

Graham Manufacturing Co., Inc.—8-page catalog details and illustrates construction and operation of heat exchanger. Unit is known as "Monobolt," since one large bolt on either end permits disassembly. This reduces cleaning time. Dimensions for various units are listed.

Vibrating Screens 19

Productive Equipment Corp.—4-page Bulletin describes and illustrates "Selectro" vibrating screens used for industrial wastes. Typical installations are shown and construction and operational details are given.

A. C. Generators 20

Columbia Electric Mfg. Co.—Bulletin Section 800 gives in pictorial form various typical frame sizes of company's latest a. c. generators available in ratings from 6.25 kva. through 375 kva., single or two bearing construction, with direct connected or top mounted exciters. Units are available in three-phase or single-phase ratings, 60 cycle, with speeds up to 1800 rpm. and standard voltages up to 2500v.

Pressure Filter 21

T. Shriver & Co., Inc.—4-page Bulletin 124 covers in detail operation and construction features of company's filter. Specifications for standard sizes are given, and types of products for which unit is used are listed.

Carton Sealers 22

Triangle Packaging Machinery Co.—4-page illustrated Bulletin describes firm's line of standardized carton sealers. Specifications and capacities of various models are listed.

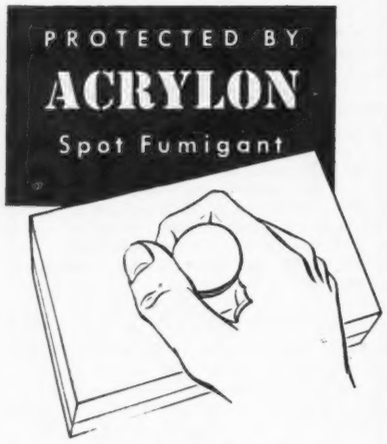
Rice Processing Equipment 23

General American Transportation Corp.—8-page Bulletin 400 describes Malek rice process and arrangements for obtaining equipment to

HOW TO GET THIS LITERATURE

Food Industries Reader Service now supplies tear-out coupon cards for your convenience in requesting copies of these new publications from manufacturers. Use one or more of the cards on the colored sheet bound near this page. Fill out, tear out, mail out and the Reader Service staff will see that your requests reach the manufacturers.

Low-Cost Protection Against Insects



Depend on ACRYLON* Spot Fumigant to keep your food-processing and handling machinery free of insects. Just pour a few ounces into the machines, where infestations commonly occur, and rid them of insects overnight. Non-flammable, ACRYLON is fast-acting and highly toxic to all insects, yet so volatile that it leaves no residue to clog machinery or harm food products in any way.

ACRYLON is economical—just a few ounces in each danger spot will give complete kill of insect pests. Available in 15-gallon and 50-gallon drums.

For Thorough Building-Wide Insect and Rodent Control

specify AERO* LIQUID HCN Fumigant. Use it periodically with in-between applications of ACRYLON to strategic spots to assure constant pest control in food plants.

*Reg. U. S. Pat. Off.

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AMERICAN CYANAMID COMPANY

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30-S Rockefeller Plaza • New York 20, N. Y.

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KEEP YOUR PLANT INSECT-FREE AT ALL TIMES WITH LIQUID HCN AND ACRYLON

set up this type plant. Flow sheet shows major units, and specifications for designed capacities are given—steam, water, electrical. Personnel requirements are also considered.

Band Ovens, Cooling Conveyors..... 24

J. W. Greer Co.—8-page folder No. 44-2 describes band ovens and cooling conveyors for sodas and sweet goods. Equipment layouts are charted, supplemented with pictures. Complete units include dough-forming equipment, band ovens, overhead cooling conveyors, automatic stackers and packing tables.

Bottle Washer 25

The Heil Co.—6-page Bulletin BW 445 describes and illustrates operation of bottle washer. Multi-color diagrams show various stages of treatment given bottles during cleaning. Details of construction and mechanisms are given.

Compressors 26

Worthington Pump & Machinery Corp.—4-page Bulletin H-620-B26 considers company's Air King compressors. Listed are capacities and ratings, single stage, for pressure up to 100 and 150 psi.; two stage for pressures of 125 to 250 psi. Specifications, weights and dimensions are given.

Automatic Caser 27

Davis Caser Co.—4-page photo folder describes company's automatic bottle caser. Plan and section drawings give dimensions, and capacity, weight and mechanical details are listed.

Pressure Cooker and Cooler..... 28

Food Machinery Corp.—18-page pocket size booklet, **One-Man-Cook-Room**, describes and illustrates continuous pressure cooker and cooler. Construction details and operation are covered, and there are full specifications.

Motor Drive 29

The Reliance Electric & Engineering Co.—8-page Bulletin 311 covers latest developments in all electric, adjustable speed (V-S) motor drives for a. c. circuits. Pointing up growing use of this drive to increase production and lower costs, bulletin contains photos covering nine specific applications in as many different industries. There are data on constant torque and constant horsepower available in models from 1 to 200 hp., together with typical graphs.

PLANT SUPPLIES

Filter Aids 30

The Dicalite Co.—4-page Bulletin covers technical data on this concern's filter aids. Engineering services available to users of product are described.

Inert Paints 31

Morton Chemical Co.—6-page foldout is being mailed regarding "Duramite pH," chemical resistant coatings. Characteristics of products are described and uses listed. Line includes coatings for both high and low temperature processing, for maintenance painting in corrosive atmospheres, for specially engineered finishes for masonry and concrete, and chemical resistant floor finishes. A variety of colors is available both to protect and identify equipment containing corrosive products.

Ion-Exchange Bead Type Resin..... 32

Resinous Products & Chemical Co.—8-page technical report covers new high-capacity synthetic resin cation exchanger offered in bead form under trade name Amberlite IR-105. Physical and operational characteristics are given. Report should interest brewers, bottlers, candy makers, vinters and food manufacturers, to whom low-cost purification of supply waters is important.

Flavors 33

Fritzsche Brothers, Inc.—16-page Bulletin describes company's various flavors and their common applications. Prices are listed.

Hot-Spray Cleaning Unit..... 34

Oakite Products, Inc.—4-page Service Report explains in text and illustrations how a new cleaning unit overcomes disadvantages of slow

DO YOUR SPRAYS CLOG?

Fig. 629

Here is a nozzle with a single round tangential inlet (instead of several small slots) which permits relatively large solid particles to pass right through and out the orifice. Produces fine breakup, even distribution, and hollow cone spray suitable for numerous applications.

Available in Brass, Stainless Steel and Hard Rubber or made to order in any machinable material. ¼" to 1" I.P.S.

Send Monarch an outline of your spray problem—if the liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzles.

NOZZLES FOR:

- ATOMIZING
- AERATING
- COOLING
- HUMIDIFYING
- MOISTENING
- RINSING
- SPRAY DRYING
- WASHING

Do you have our Catalogs 6A and 6C?

MONARCH MFG. WORKS, INC.
2517 E. ONTARIO ST.
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Experienced buyers look at the Pedigree

buyers of boxes, too

THE COCKER SPANIEL, American member of a family that traces back to the 14th century, is still a great favorite with sportsmen. Cockers are said to be so named because they were first used in hunting woodcocks. Affectionate and merry, they are perfect family pets.

FOR ASSURANCE OF *Quality*
FOR ASSURANCE OF *Service*
FOR ASSURANCE OF *Fair Price*

MOST corrugated containers *look* alike. But the difference shows up in performance.

The famous Union shield trade-mark is your assurance that every step in making the box, from the forest to the finishing room, is handled by trained personnel in the largest Kraft pulp-to-container plant in the world.

It symbolizes seventy-five years of leadership in designing, engineering and producing paper packages . . . plus long experience as one of the nation's larger producers of Kraft container board.

You can rely on Union shield-marked boxes to give you quality and service at a fair price—not only this year but for years to come!

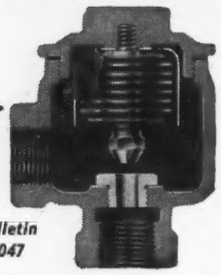
UNION *Corrugated Containers*

UNION BAG & *Paper Corporation*

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: **SAVANNAH, GA. • CHICAGO, ILL. • TRENTON, N. J. • JAMESTOWN, N. C. (Highland Container Co., Inc.)**

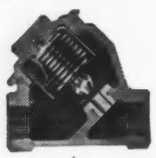
How to Keep Equipment FULL of Live Steam



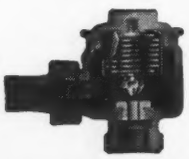
Bulletin 1047

Prompt and full drainage of condensate and venting of air and non-condensible gases are among the most important factors in maintaining maximum heat in coils, kettles, etc.

Two reasons why Nicholson thermostatic traps prove superior in test after test: (1) operate on lowest temperature differential, 5° to 15° depending on trap size and steam pressure. (2) 2 to 6 times average drainage capacity. We'll gladly send one for testing.

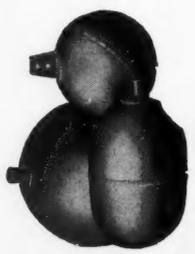


5 TYPES FOR EVERY APPLICATION—power, heat, process; size ¼" to 2"; pressure to 225 lbs. Bull. 1047 or see Sweet's.



High-Pressure Floats

In all sizes and shapes, for operating mechanisms and as tanks or vessels. Welded, stainless, monel, or steel. 2-day delivery. ***BULLETIN 348.***

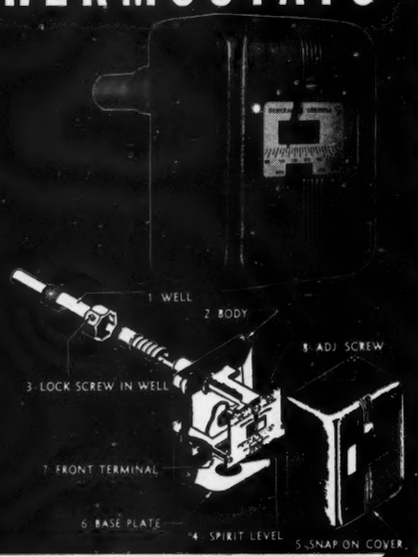


W. H. NICHOLSON & CO. 193 OREGON STREET WILKES-BARRE, PA.

New L-578 SERIES IMMERSION THERMOSTATS

8 FEATURES

1. **ACCURATE AND POSITIVE IN ACTION.** The result of design-simplicity.
2. **VISUAL LEVELING INDICATOR.**
3. **COMPLETE SELECTION OF TEMPERATURE RANGES AND SWITCH COMBINATIONS.** Models to meet every requirement.
4. **FAST REACTION TO LIQUID TEMPERATURE CHANGE.** Two-inch well provides large heat-exchange area for direct and proximity contact with temperature-sensitive element.
5. **CLOSE TEMPERATURE DIFFERENTIAL.** Approximately 10° F. in most installation conditions.
6. **TEMPERATURE SETTING EASILY CHANGED.** Just one external adjustment screw to turn.
7. **AMPLE CURRENT CAPACITY FOR USE IN ALL STANDING CONTROL SYSTEMS.** Up to 15 Amp. switch rating.
8. **MERCURY TYPE SWITCH.** Dust-proof, tamper-proof, impervious to corrosive atmospheric conditions and "pitting" characteristics.



GENERAL CONTROLS

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FOR COMPLETE SPECIFICATIONS REQUEST BULLETIN SDL-32R-2.

25-3

hand-scraping or wire-brushing in connection with cleansing food plant equipment. Unit is designed to soak and loosen soils on equipment surfaces by smooth, even discharge of detergent solutions through a spray nozzle.

Line of Flavors 35

Givaudan-Delawanna, Inc.—24-page pocket size catalog lists and describes company's large group of flavors. Materials offered are classified according to suggested use in confectionery, extract, summer beverage, ice cream, and other fields. Recommended concentrations of flavors are included, and prices are listed.

Sanitizing Agent 36

Winthrop Chemical Co.—24-page pocket size booklet on "Roccal" brand sanitizing agent. Describes and illustrates how material should be used in plant and application on various pieces of equipment.

CONTROL EQUIPMENT

Rotameter 37

Brooks Rotameter Co.—16-page catalog covers full line of rotameters for flow-rate measurement and control, including "Full-View" unit with safety shielding for normal pressures and temperatures. Capacity chart, data sheet, and dimension prints of each type of meter are included.

Control Instruments 38

The Brown Instrument Co.—Sheet 3 of a series, "Food Process Instrumentation," describes an efficient system of instrumentation for control of time and temperature variables. While specifically applied to retort sterilization of foods for canning, system can readily be adapted to many other batch processes.

Absolute Pressure Indicator 39

Wallace & Tiernan Products, Inc.—Several new ranges for company's absolute pressure indicator are listed in Technical Publication 16A. Features and specification are given. Also illustrated is new "low capacity" case for 6-in. dial model.

MISCELLANEOUS

Design Templates 40

Rapidesign, Inc.—4-page catalog covers Time-Saver templates for engineers, designers, draftsmen and architects. Each type of template is pictured, designated by number, and briefly described.

Insulation 41

American Structural Products Co.—4-page folder describes properties of Kaylo heat insulating block. An inorganic compound, product's features are described, and there is a comprehensive listing of physical characteristics under various conditions. One page is devoted to technical charts of particular value to plant and heating engineers.

Water Cooling Tower 42

The Marley Co., Inc.—4-page Bulletin AQ-48 covers complete line of re-designed Aquatowers to answer demand for a "packaged product" up to 50 tons of refrigeration. Compact new unit is sent out completely assembled.

Guide for Corrosive Fluids 43

Fischer & Porter Co.—4-page Engineering Bulletin 97 gives detailed recommendations on construction materials for use in conjunction with almost 400 different corrosive liquids and gases. It was designed specifically for selecting materials to be used in company's flowrator instruments for measuring flow of corrosive fluids. Bulletin is intended purely as a technical aid for designers and engineers.

Blowers 44

Bryant Heater Co.—Bulletin 6A-4 concerns company's complete line of light weight, Hi-Flo centrifugal blowers in 4-18 oz. pressure range, 6,000 to 48,000 cfh. capacities. Bulletin includes photos and diagrams, also capacity and dimensional tables, for complete series. Filter combinations are described for operation in difficult locations.

FOOD TECHNOLOGY
NEW DISCOVERIES AND INVENTIONS

DEHYDRATION

Browning of Milk Powder

POWDERS of whole milk and ice cream mix, made by commercial spray processes, have been studied to determine the effect of browning during storage. The discoloration was found to be a function of moisture content and temperature of storage. Contamination with iron and possibly copper, added antioxidants, and possibly vanillin in ice cream mix powder, may accelerate rate of browning but are of minor importance. The browning is accompanied by production of CO_2, uptake of oxygen, increase in reducing groups, marked decrease in solubility, increase in titratable acidity, and development of caramelized flavor. From experimental data it is evident that these powders do not brown when their moisture content is below 4 percent and the storage temperature is 104 deg. F. or lower. The development of stale and oxidized flavor in such powders, under conditions of high available oxygen, is independent of browning. In fact the caramelized flavor produced by browning, the intensity of which parallels the degree of browning, will mask any flavor due to deterioration of the powder; and the products of browning reaction inhibit the development of off flavors.

Digest from "A Study of the Browning Reaction in Whole Milk Powder and Ice Cream Mix Powder," by N. P. Tarassuk and E. L. Jack, *Journal of Dairy Science*, vol. 31, 255–68, April, 1948.

ENGINEERING

Novel Ice Maker

ICE PRODUCTION at the rate of 12–26 tons per day by means of natural freezing during cold weather using a simple installation known as the Leifer system, has been put into use in parts of Germany. The installation consists of a slowly revolving tower, about 10 ft. high and 10 ft. in dia. mounted on a strong lattice-work mast. The tower is shaped like a truncated octagonal pyramid, with each face pivoted at its base and capable of swinging outward so that its slope is reversed. The faces are made of corrugated galvanized iron and their outward motion can be induced by a knee-joint at their tops, which also deforms the corrugations slightly in so doing.

As the tower is slowly revolved, water is sprayed onto its faces at one or more points. In freezing weather a layer of ice builds up on them that readily reaches one ft. in thickness. At this thickness the total load of ice is about 10 tons. The time required for its formation varies with the temperature and the amount of wind. Artificial draft towers load up faster. When the ice is thick enough the knee-joints are operated from the inside of the tower, the ice tumbles off and in a few minutes the tower begins the collection of a fresh crop of ice.

Labor cost is limited to the time required for one man to operate the knee-joints that remove the ice; power, to the operation of the water spray pump and the turning of the tower. Because of its slow rate of turning the latter requires only about ⅓ hp. These costs, and the cost of the water, make up the operating costs of a relatively simple installation that will produce large amounts of ice from natural cold.

Digest from "Experiments With a New Process for Rapid and Economical Utilization of Natural Cold," by S. Zimmermann, *Die Brauwelt*, vol. 9, 168–70, April 29, 1948.

CEREALS

Compressed Cereals

ALTHOUGH most dry cereals in the form of flakes or granules are not readily compressed into cakes that retain their shape during the handling incidental to packaging, the problem can be solved, according to a recent patent, by incorporating in the mixture a small quantity of glycerine. About one percent by weight of this substance has a pronounced effect on the ability of the food particles to adhere to one another, and yet be easily separated when being prepared for use. Propylene, ethylene and other glycols can be used in place of glycerine. All are physiologically inert in the quantities used. When used as a binding agent they have none of the sticky characteristics of gums or sirups, and do not adhere to the dies of the compression machinery. It is believed that this desired action results from the fact that the glycerine binders are hygroscopic. Moisture initially present in the dry cereal is collected at the surface of the particles and makes the binder sufficiently tacky to cause them to adhere to one another under compression. The resulting product can be merchandised in the form of blocks or discs, and can be disintegrated for use if desired. The patent specifications give examples of compressed farina, cracker meal, premixed cereals, skim milk powder, chocolate beverage, soup mix and potato meal.

Digest from U. S. Patent 2,437,150, issued March 2, 1948, on an application dated September 16, 1944, to Isadore A. Berg, Cincinnati, O.

Starch from Cereals

IMPROVEMENT in existing methods of producing starch from cereal grains is claimed in a recently patented process. The present invention rests in the discovery that when the gluten of cereal grains is brought in contact with water, it is hydrated to a colloidal gel which can be liquified by mechanical treatment, thereby releasing substantially all the starch without steeping or equivalent processing. Dry milling is the preferred procedure in order to remove the germ and fibrous matter, leaving a starch-gluten flour for further treatment. When the latter is mixed with water, the protein-water gel system can be converted into a liquid sol by passing through a colloid mill. Following the dispersion treatment, the slurry is passed over settling tables or through centrifugal apparatus for the separation and recovery of both starch and gluten.

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Although the process may be carried out without the use of chemical reagents, it will usually be desirable to use certain chemicals for specific purposes. Either an alkali or acid may be used to facilitate dispersion of the gluten and separation of the starch, depending on the type of grain. Thus for wheat slurry the pH is adjusted to 6.8-8.5; for corn, 6.5-8.0; for rice, 9-10. After separation from the starch recovery of gluten will be facilitated by addition of an acid reagent. To inhibit bacterial growth during the drying of the starch, an acid reagent is usually employed to bring the starch slurry to a pH of between 3 and 5 before drying. Lime will be found effective in overcoming ransidity in the finished starch, and for this reason lime should be used to adjust the pH of the slurry prior to dispersion. Antioxidants also may be added to the starch before, after, or in conjunction with the acid used for acidification.

Digest from U. S. Patent 2,437,036, issued March 2, 1948, on an application dated Dec. 22, 1943, to H. K. Murer, Summit, and Wm. A. Mitchell, Cedar Grove, N. J., and assigned to General Foods Corp., New York.

BREWING

Stability of Beer

BIOLOGICAL and non-biological factors may alter the property of maintaining good condition, clarity and correct beer flavor. Bottled beer is chiefly affected by stability difficulties. Pasteurization achieves biological stability, but in England and many other parts of the world the bulk of bottled beer is not pasteurized.

Turbidity of beer, the most serious effect of instability, can take the form of "chill haze," which appears when the beer is cooled to 50 deg. F. or below, and "oxidation haze" which appears on prolonged storage at ordinary temperatures. The chill haze substance is a complex of protein with 35-40 percent tannin. Copper and iron are also present, and undoubtedly catalyze the oxidation of chill haze to the more insoluble oxidation haze.

Removal of chill haze by addition of proteolytic enzymes such as pepsin or papain is widely practiced. Precipitation with tannin has also been resorted to. Adsorption with alumina, activated carbon or bentonite, has also proved effective. Any treatment to remove turbidity is at the risk of removing too much protein, and thereby injuring the body or palatability of the beer, and its foam-forming and foam retaining properties.

Formation of oxidation haze is reduced by keeping pH of the beer low, and by storage and bottling so that in-

Added appeal

. . a better way

to merchandise your food products

More than a year ago, food sales analysts predicted more competition ahead for all kinds of food products.

That prediction has come true.

Manufacturers are devising new ways to meet this increased competition.

What better way to merchandise your food product—to get housewives to reach for it—than to give it extra "nutrition appeal" and *advertise* that fact?

Many mothers today no longer buy *just* food. They want better nutrition—more nourishment for the well being of their families.

This buying attitude will undoubtedly become even more pronounced as more housewives learn the value of the words "enriched" or "fortified" on a food package.

Many food manufacturers have already fortified their candies, cereals, baby foods and other products.

If you are considering fortifying one or more of your food products, remember this: Standard Brands' experience in the food fortification field—and its products for vitamin B-complex, vitamin D and protein supplementation of foods—place this company in a position to render valuable assistance to you.

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JACKSON & CHURCH COMPANY'S ZENITH CONTINUOUS PULP PRESS offers GREATER efficiency and GREATER profits . . . with the hydraulically-operated cake discharge port or "floating cone."

Long the finest dewaterer on the market, Zenith's new 100% automatic operation assures CONSTANT, UNIFORM discharge pressures at any pre-determined degree. Finger-tip adjustment assures drier cake of uniform consistency.

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WORK WELL DONE SINCE '81

troduction of oxygen from the air is kept at a minimum. Addition of reducing substances such as "reductones" prepared by heating glucose in alkaline medium, melanoidins produced by heating glycine and glucose with ammonia, and reducing derivatives of tannic acid, is being studied in European brewing centers.

Foam formation in beer depends on its carbon dioxide content, but foam retention is governed by the surface tension of the beer, its viscosity, vapor pressure, contact with air, fats or soap, as well as on the presence of protein substances which are not identical with those causing haze. Different strains of yeast may also produce beers of differing foaming properties.

Digest from "Some Scientific Aspects of Beer," by H. J. Bunker, *Chemistry and Industry*, 339–44, May 29, 1948.

Wort Boiling

WORT is sterilized by boiling for 30 min. at 212 deg. F.; enzymatic action ceases at even lower temperatures. Coagulation of proteinaceous substances, extracted during mashing and from the hops, takes place during the boiling and is aided by violent agitation. Experiment shows that in wort from a kettle boiled with vigorous agitation, an abundant and compact precipitate forms; in wort without agitation the precipitate is loose and smaller in volume.

Physical character of the precipitate and its amount also depend on the materials and methods of mashing. Infusion mashing yields worts that exhibit increased precipitation by agitation over worts from mashes made by the decoction process. Mashing at low temperature, or mashes that have been allowed to cool unevenly before filtering, lead to hazy or milky worts that cannot be coagulated by boiling. Because of their high soluble nitrogen content they are very susceptible to bacterial infection.

Kettles for boiling wort should not be too deep, both to avoid explosive boiling or bumping, and to increase the surface from which vapor can escape. Means for agitating should be included, either by design of the heat exchanger if steam is used for heating, or mechanically, or both. Agitation is especially important for the direct-fired brewing kettles to which many of the smaller European breweries are now returning. Vigorous agitation increases the exhaustion of the hops, not always to the advantage of the beer, however.

Systems of boiling wort under pressure are entirely feasible and give good results. After the hop addition, the wort is boiled for 30 min. without pressure, then for 40 min. at 10–12 psi. The higher temperatures—up to 248

What's your sales and profit I.Q. ?

Which type of sales do glass containers stimulate?

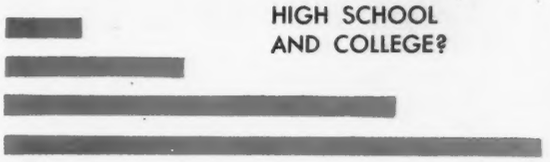
☐ IMPULSE ☐ PLANNED

ANSWER:

Both! Many people *plan* to purchase products in glass because of their strong preference for this container. But 45.5% of all processed foods are bought on *impulse*. And glass has a great advantage in creating such unplanned purchases because the goodness of the product is on full display at all times.

Here are four graphs showing the difference in strength of housewife demand to "see before she buys," depending on her education. Can you correctly label each graph with—

NO SCHOOLING,
GRADE SCHOOL,
HIGH SCHOOL
AND COLLEGE?



ANSWER:

You're right if you used exactly the order listed! Your best customers, your customers who *influence others*, are leading the swing to glass.

Can you number these advantages customers feel about glass containers, in their order of importance?

☐ "THEY'RE MORE SANITARY"
☐ "I SEE WHAT I'M GETTING"
☐ "HANDY FOR STORAGE"

ANSWER:

National consumer survey of packaging preferences reports these three major advantages of glass containers rank 1, 2, 3, as listed above. Other opinions listed by consumers are: "products look more attractive; glass preserves food better, longer; protects flavor; easier to open."

Do you know in which of these national publications Duraglas Container advertising is selling your products in glass?

☐ SATURDAY EVENING POST ☐ LADIES' HOME JOURNAL ☐ AMERICAN WEEKLY

☐ GOOD HOUSEKEEPING ☐ McCALL'S ☐ PARENTS' ☐ SUNSET

ANSWER:

Duraglas container campaigns are hard at work for you in *all* the above publications, selling your products in glass. Over ½ billion reader-impressions this year!

HERE'S A CURRENT ADVERTISEMENT SPOTLIGHTING FRUIT COCKTAIL IN DURAGLAS CONTAINERS

SCORING

Three or four right—There's *nothing* wrong with *your* glass-pack sales and profit I. Q.

Two right—You're in the top third of your class. Make a higher mark in sales and profit by taking full advantage of the power of glass packaging to build your sales.

One or none right—Don't flunk out of the profit picture. Pack in glass! Give customers a chance to buy your food the way they want it—in glass!

Duraglas TRADE MARK REG. U.S. PAT. OFF.

CONTAINERS SELL ON SIGHT

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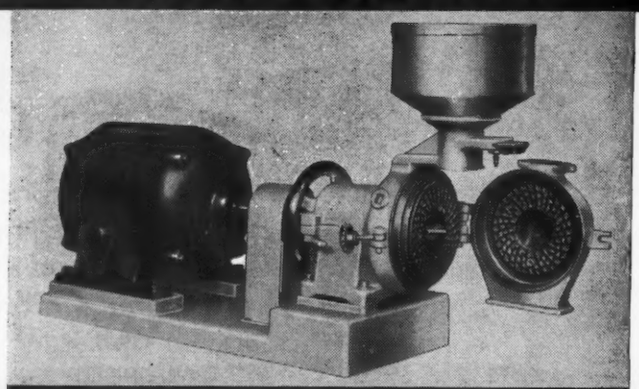
TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

IS THIS YOUR SIZE?



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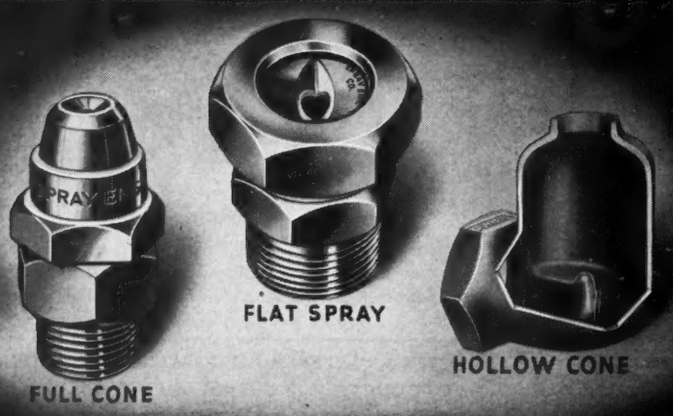
If you need a relatively small mill of great versatility, the Bauer No. 148-1B is built for you. It pulverizes almost anything—metal, wood, minerals, nut shells, grain, seeds. It also grinds coarse, cracks, granulates, shreds, fluffs. You simply select the right plates or discs and set them the desired distance apart for the results you want.

If the mill might run too hot, a water-jacketed case can be furnished.

The mill can be equipped with direct motor drive or sheave for V-belts. Power input may be 3 to 20 h.p. Built-in ammeter indicates applied power load. Usual mill speed is 3450 rpm.

If this sounds interesting so far, ask for fully descriptive literature. Write or wire now while you have the notion.

THE **BAUER BROS.** CO., Springfield, Ohio



SPRACO NOZZLES

Write for NOZZLE CATALOG *to*

SPRAY ENGINEERING CO.

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deg. F.—coagulate proteins very effectively, without increasing wort color.

Digest from "Boiling and Hopping of Wort," by Ed. Willemart, *Le Petit Journal du Brasseur*, vol. 56, 352–57, April 30, 1948.

MEATS

Protein Concentrate From Liquid Meat Packing Wastes

A LOW-ANALYSIS protein concentrate may be recovered from liquid wastes from meat packing plants. Screening or sedimentation will remove fat and fibrous materials. By reducing the pH of the waste to 4.0-5.2, and coagulating the precipitate formed with ferric or aluminum salts, a concentrate is recoverable, which when dried may contain 35-40 percent protein and 25 percent ether—soluble extract. Hogs and cattle made normal gains on feeds containing not more than 3 percent of the recovered material.

The effluent from the chemical sedimentation treatment is readily handled by trickling filters to reduce the B.O.D. still further. Both treatments achieve a major reduction in B.O.D. of the wastes, but the recovered protein will pay only a small part of the cost of the treatment. If the fat and protein could be recovered separately from the coagulum produced, the return would be much greater.

Digest from "Chemical Precipitation of Meat Packing Wastes," by M. D. Sanders, *Industrial and Engineering Chemistry*, vol. 40, 1151–52, June, 1948.

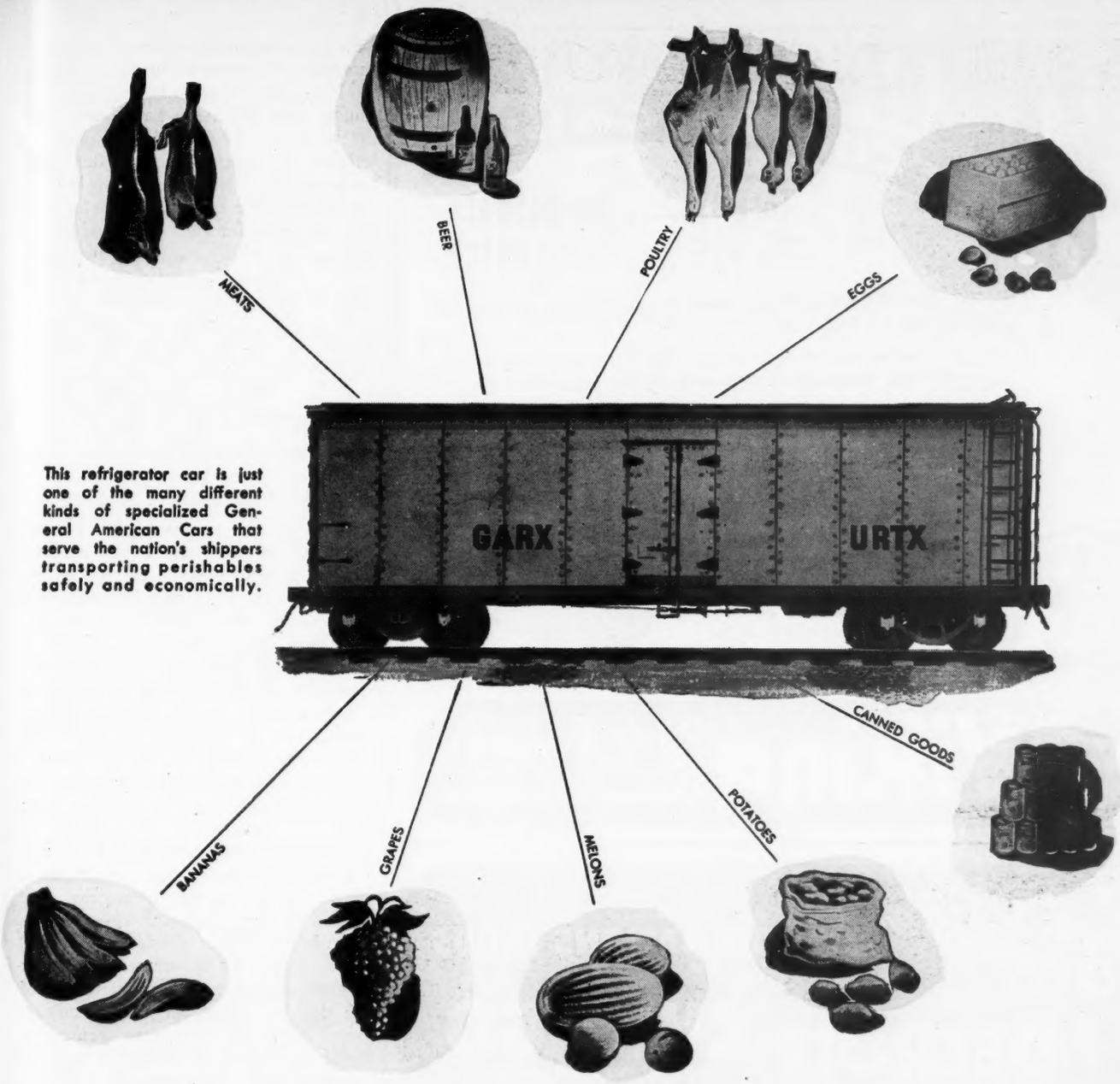
MICROBIOLOGY

Mustiness in Foods

MUSTINESS or earthy odors in food products, storage rooms, and on processing equipment are due to growth of a few species of microorganisms. Some of these emit such penetrating odors in pure culture that the microbiologist must destroy his cultures and seal stock strains.

Bacteria producing musty odors in eggs or meat are usually *Pseudomonas graveolens or Achromobacter perolens.* Most strains of the former lose their musty character after a few transfers on nutrient agar. Both organisms have thermal death times of 30 min. at less than 145 deg. F. The earthy odors characteristics of old cellars, potato bins and freshly plowed earth, are usually due to *Actinomyces* species. They have been found in musty milk, grains, walnut meats, dried fish-flakes, and probably in eggs. Actinomyces species can be killed by 173 deg. F. or less in 20 min.

The chemical nature of the musty



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Power requirements are exceptionally low. Long, dependable life assures economical use.

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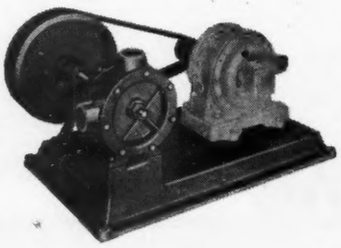

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Four Modern Fortresses For Guarding The Nation's Foods

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500 EAST THIRD ST.
ZONE 6

smell is not known, but it is evidently nontoxic. Cultures of musty organisms do not effect laboratory animals, and musty eggs and meats have been eaten by men in ½-lb. quantities without ill effects. Cooking did not rid the foods of mustiness. One strain of *Achromobacter perolens* has proved useful as a test organism for antiseptics and germicides. Since only a slight growth produces a noticeable mustiness, no other test for inhibition is necessary.

Digest from "Mustiness in Foods" by L. B Jensen, *Food Research*, vol. 13, 89–93, March–April, 1948.

DAIRY

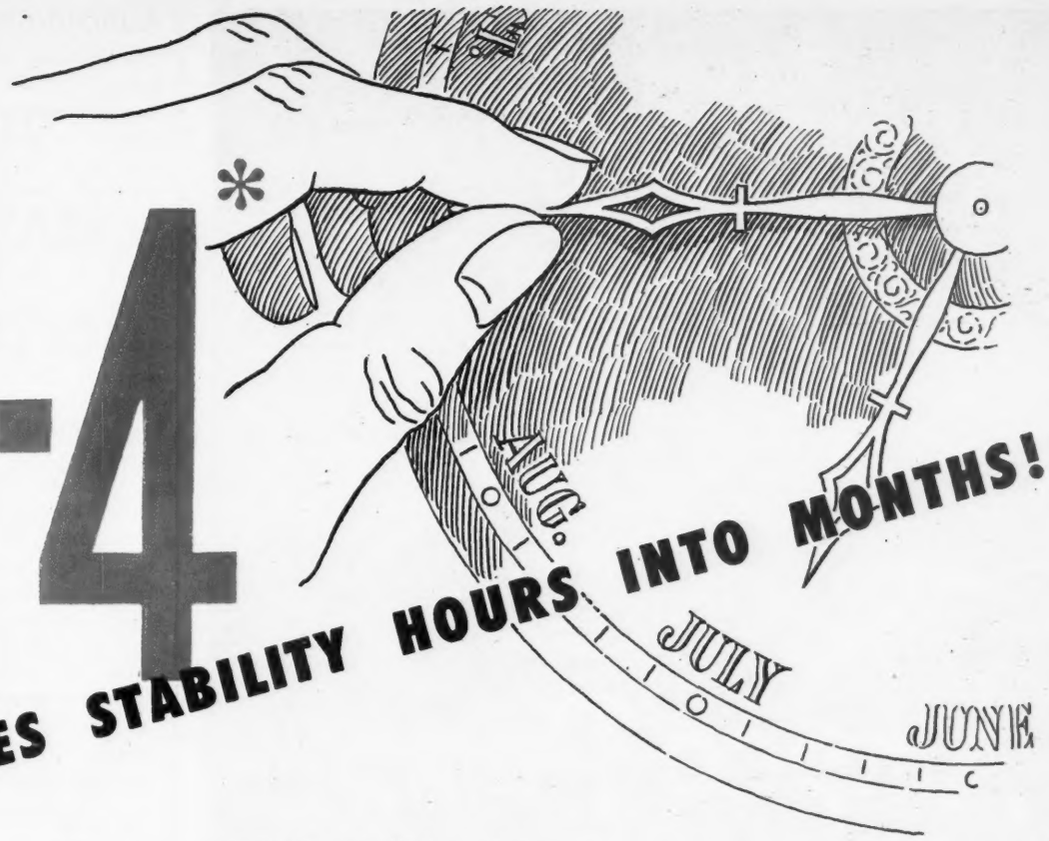
Lipase For Blue Cheese

MILK LIPASE, necessary for normal ripening of blue or Roquefort-type cheese, is destroyed by pasteurization. Therefore the addition to the curd of a lipase from some other source would be useful. Several microorganisms are known to be lipolytic, but after preliminary study of them, *Mycotorula lipolytica* was selected for detailed investigation. It was found to grow well on nutrient broth with 0.05 percent glucose added. Milk media were not satisfactory. Lipase production was best in a phosphate-citrate buffer at pH 4.5-5.5, and at 86 deg. F. Accumulation of lipase was favored by a non-aerated culture producing low yields of long, slender cells, rather than by the higher yields of short oval cells obtained by aeration. Under proper conditions lipase activities of 50 deg. or more per ml. of culture were obtained, a degree being the number of ml. of N/1 NaOH required to neutralize the free fatty acids in 100 g. of fat.

When tried on butterfat over a pH range of 4.0-8.0, the lipase of *M. lipolytica* had optimum activity at 6.2, and was active over the entire range in which blue cheese ripening takes place, 4.7-6.5. Although the optimum temperature for the enzyme or butterfat is 82-91 deg. F., it has considerable activity at 50 deg. F. Attempts at concentration and purification of the lipase have resulted in large losses of activity. Lyophilization was least detrimental. Cell-free preparations of the enzyme, obtained by centrifuging and filtering cultures, keep well for at least 3 months at 41 deg. F. The characteristics of the enzyme indicate that it may have value for the replacement of milk lipase in the manufacture of blue cheeses from pasteurized milk.

Digest from "Factors Influencing the Production of Lipase by *Mycotorula Lipolytica*" and "Preliminary Characterization of the Lipase of *Mycotorula Lipolytica*" by I. E. Peters and F. E. Nelson, *Journal of Bacteriology*, vol. 55, 581–91, 593–600, May, 1948.

G-4*



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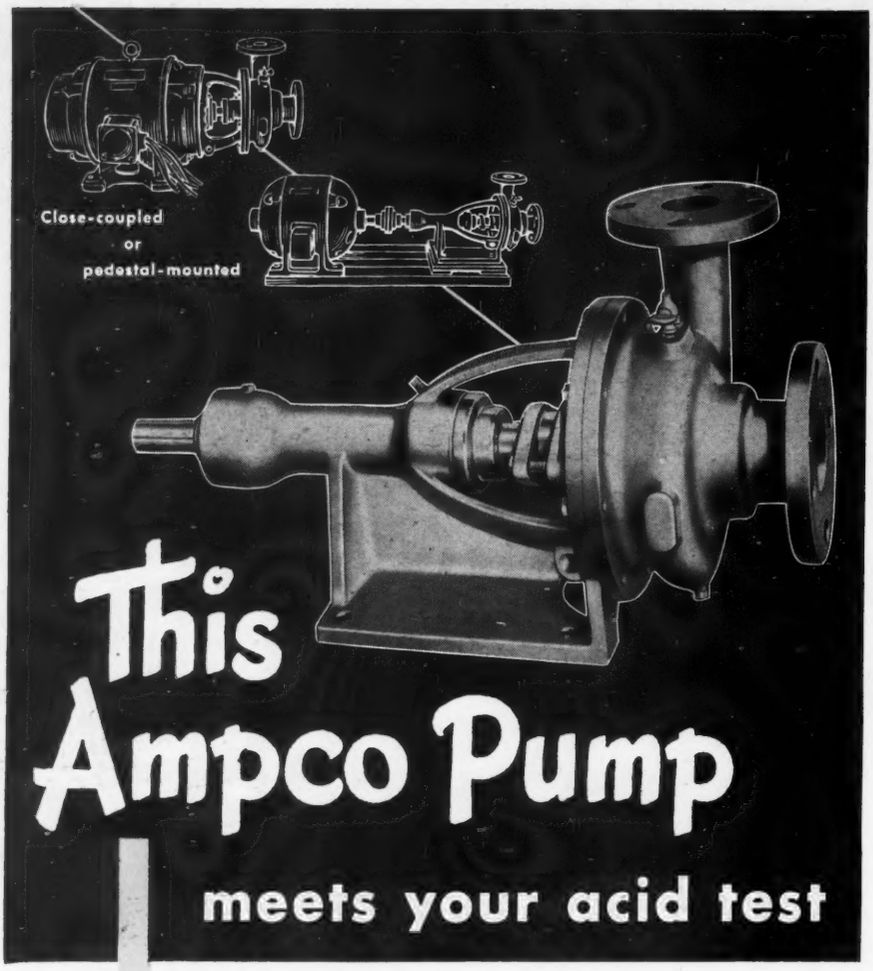

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Autoxidation of Fats

SEPARATION of the peroxidic compounds resulting from fat autoxidation has been attempted by chromatographic adsorption methods, evaluating the results by a study of the ultraviolet absorption spectra and by determination of the peroxide content. Methyl esters of corn oil were used in the preliminary development of a chromatographic technic, which was later applied to oxidized methyl linoleate. Sodium aluminum silicate was used as the adsorbent for the oxidation products, being loosely packed in a column one in. inside dia. and wetted with isooctane.

As shown by both the peroxide value determinations and the absorption curves in the corn oil investigation, the most highly oxygenated substances are concentrated in the upper portion of the column. This is consistent with the concept that molecules of greatest polarity would be adsorbed more strongly and therefore appear in the upper portion of the column. The less oxygenated should be found lower in the column. This relationship held with the adsorbed fractions from the oxidized methyl lineolate.

In a sample of corn oil methyl esters oxidized to a peroxide value of 1,003 m.e./kg., the PV was reduced from 1,003 to 28 by being passed through the column, and the sample was chromatographically separated into fractions with PV's ranging from 28 to 2,790. Oxidized methyl linoleate went into the column with a PV of 377 and the percolate had a value of 7. The sections of the adsorbent, from the top down, had PV's of 3,500, 3,280, 4,000, and 1,000. It is believed that a method has been demonstrated whereby primary oxidation products can be separated from secondary products, and concentrated for further study of reactions occurring during fat oxidation.

Digest from "A Chromatographic Study of Autoxidized Methyl Linoleate," by L. R. Dugan, Jr., B. W. Beadle and A. S. Henick, *Journal of the American Oil Chemists' Society*, vol. 25, 153–57, May, 1948.

FISH

Browning of Fish Products

BROWNISH discoloration and flavor changes which occur during the canning of certain white fleshed fish are probably due to the so-called Maillard reaction—the effect of heat upon solutions of a reducing sugar and an amino acid. Control measures for this reaction are (1) Removal of one or both of the reacting substances, as by removal of reducing sugars by leach-

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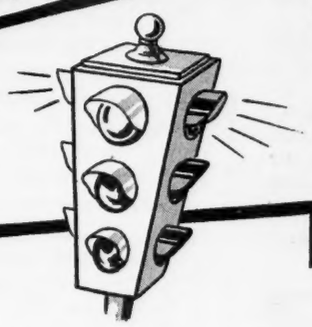

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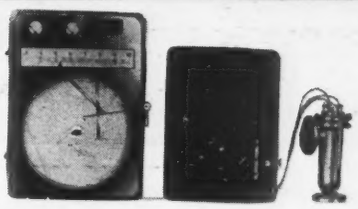

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ing or fermentation; (2) addition of SO_2 or substances which release SO_2 and (3) storing dried products of low moisture content.

When lingcod flesh was leached in running water for some hours, the brown discoloration which occurred on heat processing the untreated flesh was either absent or less intense, depending on the length of the leaching process. When a reducing sugar was added to the leached flesh, heating caused marked brown discoloration. Oxygen from the air did not appreciably affect intensity of discoloration. The addition of sodium bisulphite to red cod flesh prior to heat processing either decreased or eliminated the brown discoloration.

The browning reaction is known to proceed more slowly in acid environment, but it appears that large amounts of the acids commonly employed in canning must be added before browning is appreciably retarded. Sodium sulphite is also effective, although large concentrations are required.

Digest from "Probable Cause of the Browning of Certain Heat-Processed Fish Products," by H. L. A. Tarr, Progress Report of the Pacific Coast Stations, Vancouver, B. C. No. 74, 17-18, March, 1948.

MISCELLANEOUS

Pectic Acid Acidulant

BAKING powders and effervescent medicinal products that depend for their efficiency on reaction between a solid acid and a carbonate, are subject to deterioration due mostly to adsorption of atmospheric moisture. According to a recent patent specification, pectic acid has peculiarly advantageous properties when used either wholly or partly as the acidulant in such mixtures. It lengthens their useful life and controls the release of CO_2. When used in baking powder or prepared flours, baked goods may be made with either sweet or sour milk. No undesirable mineral residue is left in the finished product. In therapeutic agents, pectic acid may be used as the acidulant in analgesic, cathartic or similar preparations. A typical composition for therapeutic use contains, in grams: milk sugar, 79.4; pectic acid, 15.6; sodium bicarbonate, 5.0. A simple leavening powder may be prepared from the following 100-lb. formula: pectic acid, 65; sodium bicarbonate, 25; starch, 10. Approximately 13 percent of the available CO_2 will be evolved.

Digest from U. S. Patent 2,436,086, issued Feb. 17, 1948, on application dated Feb. 16, 1942, to W. E. Baier, Ontario, Calif., and assigned to California Fruit Growers Exchange, Los Angeles, Calif.

BOOKS

Bacteriological Text

FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY, THIRD EDITION. By A. J. Salle. Published by McGraw-Hill Publishing Co., 330 W. 42nd St., New York 18, N. Y., 1948. 730 pages; 6¼ x 9¼ in.; cloth. Price $6.

The food chemist will probably require no introduction to this book, even though it has been thoroughly revised and completely rewritten in this third edition.

With its material thus brought up to date, the book remains a standard text. Fundamentals are stressed and emphasis is placed upon the importance of chemistry in gaining a clearer understanding of the composition of bacteria and the reactions they produce.

Research References

ADVANCES IN CARBOHYDRATE CHEMISTRY, VOLUME 3. Edited by W. W. Pigman and M. L. Wolfrom. Published by Academic Press, 125 E. 23rd St., New York, N. Y., 1948. 424 pages; 6¼ x 9¼ in.; cloth. Price, $8.50.

Advances in Enzymology, Volume 8. Edited by F. F. Nord. Published by Interscience Publishing Co., 215 Fourth Ave., New York 3, N. Y., 1948. 538 pages; 6¼ x 9¼ in.; cloth. Price, $8.

Here are two new volumes with reviews of sectors of their respective fields. Each contains chapters that may be applied in food research.

Air Ways

FAN ENGINEERING, FIFTH EDITION. Edited by Richard D. Madison. Published by Buffalo Forge Co., 152 Mortimer St., Buffalo, N. Y., 1948. 808 pages; 4½ x 6¾ in.; composition. Price, $6.

This handbook has been growing in size and value through the years until now it is recognized as the "bible" of its industry. The first new edition since 1938 gives greater coverage to air conditioning, particularly engineering data, than did its predecessors.

The books' four parts respectively treat: Physics of Air, Fans, Fan Applications, and Fans and Air Conditioning Equipment. It should be useful in the food plant as well as the laboratory.

Basic Formulas

THE CHEMICAL FORMULARY, VOLUME VIII. Edited by H. Bennett. Published by The Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y., 1948. 448 pages; 5¾ x 8¾ in.; cloth. Price, $7.

Close to two pages in the index are required to list the food product formulas that are included in this volume. Many of them are new to the series, some are being published for the first time.

These formulas are useful to the food chemist, chiefly as starting points from which he may work out ideas. The book further provides a convenient reference, compiling as it does, formulas from the whole broad field of chemistry.

Modern Farming

FARM MACHINERY AND EQUIPMENT. THIRD EDITION. By Harris Pearson Smith. Published by McGraw-Hill Publishing Co., 330 W. 42nd St., New York 18, N. Y., 1948. 520 pages; 6¼ x 9¼ in.; cloth. Price, $5.

As a reference on farm operations this volume could be useful to food processors working directly with growers of the raw materials. The book has been revised since the appearance of the previous edition, ten years ago. Much obsolete material has been deleted and replaced with newer developments, particularly in the field of farm machinery.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.

GLASS CONTAINERS FOR COTTAGE CHEESE AND SOUR CREAM. National Bureau of Standards, Simplified Practice Recommendation R148-47. Price 10 cents. Specifies capacities, weights, dimensions, and finish recommended as a voluntary standard, effective Dec. 31, 1947.

PORCELAIN-ENAMELED STEEL UTENSILS. National Bureau of Standards, Commercial Standard CS100-47. Price 10 cents. Includes technical definitions, but not complete specifications.

WOOD-SUGAR MOLASSES FROM WOOD WASTE. By Elwin E. Harris. Forest Products Laboratory, Madison 5, Wis. No. R1704. Includes suggested process and process flow sheet with estimates of cost.

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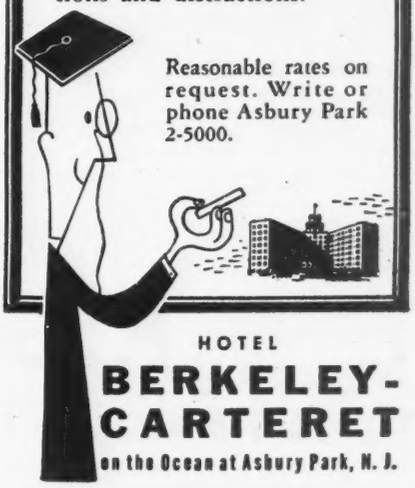

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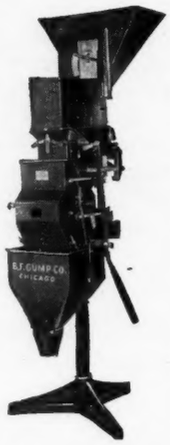

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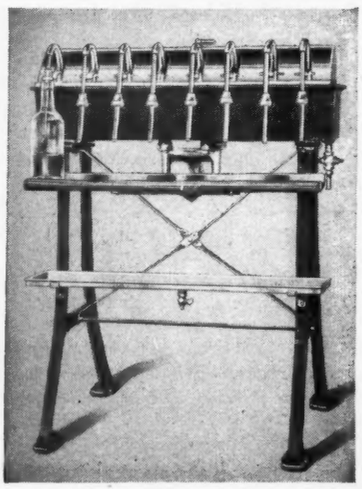

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RELATION BETWEEN URINARY CALCULI AND USE OF GRAIN SORGHUM IN STEER-FATTENING RATIONS IN THE SOUTHERN GREAT PLAINS. By W. H. Black, et al. Department of Agriculture, Technical Bulletin No. 945. Price 5 cents.

NUTRITIONAL QUALITIES OF RANGE FORAGE PLANTS IN RELATION TO GRAZING WITH BEEF CATTLE ON THE SOUTHERN PLAINS. Experimental Range. By D. A. Savage and V. G. Heller. Department of Agriculture, Technical Bulletin No. 943. Price 15 cents.

THE BALANCE SHEET OF AGRICULTURE, 1947. Department of Agriculture, Miscellaneous Publication No. 642. Price 15 cents. A statistical and economic review of general rural conditions and farm economy, but no crop or animal industry details.

UNITED STATES ASSOCIATIONS IN WORLD TRADE AND AFFAIRS. By Jay Judkins. U. S. Department of Commerce, Industrial Series No. 70. Price 30 cents. Directory of 900 organizations in 190 cities in the United States that have a special interest in foreign trade, international affairs, or world peace; also text and statistics on the foreign trade of the United States and other nations.

CLEAN AIR (Removal of Dusts). Division of Labor Standards, Controlling Chemical Hazards Series No. 7. Price 10 cents. Nontechnical. Primarily for employees' use for whom "exposure to harmful dusts, fumes, vapors, gases lowers physical efficiency in any industry and may cause serious illness or even fatalities."

MEAT ANIMALS, FARM PRODUCTION AND INCOME, 1924-44: Revised Estimates by States. Bureau of Agricultural Economics. Processed. Statistical.

FOREIGN MARKS-OF-ORIGIN REGULATIONS. U. S. Department of Commerce, Economic Series No. 62. (Revised edition of Trade Promotion Series No. 199.) Price 35 cents. An elaborate list of details of regulations with illustrations for numerous commodities.

PRODUCTION OF MANUFACTURED DAIRY PRODUCTS, 1946. Bureau of Agricultural Economics. Processed. An elaborate statistical report.

FARM PRODUCTION, DISPOSITION, AND INCOME FROM MILK, 1946–47. Bureau of Agricultural Economics. Processed.

THE MANUFACTURE OF LOW-ACID RENNET-TYPE COTTAGE CHEESE. By H. R. Lochry. U. S. Department of Agriculture, Miscellaneous Publication No. 119, revised April 1948. Price 5 cents.

PATENTS

Yeast- and Vitamin-Rich Products Produced by Growing Yeast and Mold on Air-Pervious Masses of Vegetable Particles Coated with Thin Films of Active Yeast Wort—G. A. Jeffreys, Salem, Va., to Nelson Littell, New Canaan, Conn. No. 2,440,546. Apr. 27, 1948.

Fat-Impregnated Farinaceous Particles Made by Mixing Exploded Particles with Melted Fat, Subjecting Mixture to Partial Vacuum, Increasing Pressure and Cooling—C. G. Harrel and R. O. Brown, to Pillsbury Mills, Inc., Minneapolis, Minn. No. 2,440,604. Apr. 27, 1948.

Oxidizable Material Stabilized by Addition of Hydrogenated Scum Obtained During Vacuum-Steam Deodorization of Fats Containing Tocopherol—K. C. D. Hickman, to Distillation Products, Inc., Rochester, N. Y. No. 2,440,606. Apr. 27, 1948.

Dough Units Formed by Extruding Dough in Continuous Cylindrical Form, Dividing into Desired Size by Wire Cutter and Coating with Film of Flour in Continuous Mechanical Manner—H. E. Hahn, Jr., to Hahn Baking Co., Milwaukee, Wis. No. 2,440,655. Apr. 27, 1948.

Citrus Fruit Partially Frozen Preliminary to Peeling by Attrition and Disintegration of Flesh for Extraction of Juice by Centrifuging—M. E. Dunkley, Vernalis, Calif. No. 2,440,676. May 4, 1948.

Food Made to Contain Charred Organic Material as Ingredient Beneficial to Decrease of Gastric Disturbance in Digestive Tract—C. L. Peterson, Salt Lake City, Utah. No. 2,440,699. May 4, 1948.

Acid Fruit Pomace Treated for Recovery of Ethyl Alcohol and Water Soluble Tartrate Content—E. K. Metzner, Los Angeles, Calif. No. 2,440,907. May 4, 1948.

Vegetables Conveyed in Continuous Manner through Hypochlorite Disinfecting and Ice Cooled Liquid Bath to Aid in Preservation of their Natural Fresh Condition—H. M. Pancoast, San José, Calif. to Food Machinery Corp. No. 2,440,911. May 4, 1948.

Potatoes Sliced in Unit Equipped with Stationary Horizontal and Vertical Knives Operated in Conjunction with Reciprocating Carriage—Geo. Masrob, Detroit, Mich. No. 2,441,027. May 4, 1948

Maleic Acid Converted to Dry, Pure White Fumaric Acid with Sharp Melting Point of about 294 deg. C.—A. P. Dunlop, Riverside, Ill. to Quaker Oats Company, Chicago. No. 2,441,238. May 11, 1948.

Sugar-Containing Liquids Treated with Mixture of Magnesium and Calcium Oxide to Form Precipitate as One Step in Refinement—J. J. Naugle, New York and L. Wickenden, Manhasset, N. Y.; two-fifths to Andres Bay Trading Corp., New York, and two-fifths to Cuban Dominican Sales Corp., New York. No. 2,441,281. May 11, 1948.

Flour Mixed with Water Containing Crystalline Salt of Free Aneurin Base and Spray Dried to give Granular Powder Consisting of Rounded Particles as Premix for Treating Flour to be Nutritionally Enriched—Albert Green, Chislehurst, England. No. 2,441,409. May 11, 1948.

Mixed Liquid Ingredients Homogenized during Passage Through Unit Equipped with Disks Operating in Opposite Direction and Fitted with Radially Spaced Concentric Projection Blades—J. B. McFadden, to United Dairy Equipment Co., West Chester, Pa. No. 2,441,711. May 18, 1948.

Crisp Bread made in Machine Equipped with Pricking Roll Mounted above and across Dough String Passing over Supporting Roll on Cloth Conveyor—Aron Birger Svensson, Filipstad, Sweden. No. 2,441,731. May 18, 1948.

Butter and Similar Plastic Material Simultaneously Cut and Imprinted by Mechanical Means—C. Doering, H. H. Doering, E. W. Anderson and B. J. Skoglund, Chicago, to Charles Doering and Henry H. Doering. No. 2,441,757. May 18, 1948.

Vanillin Reacted with Fused Potassium Hydroxide at about 115-235 deg. C., to free it of Protocatechuic Acid—I. A. Pearl, to Institute of Paper Chemistry, Appleton, Wis. No. 2,441,839. May 18, 1948.

Cocoa Beans Freed of Undersirable Taste-Impairing Organic Substances by Treating with Superheated Steam at Pressure Below Atmospheric—Olaf Edwin Widén, Ljungsbro, Sweden. No. 2,441,861, May 18, 1948.

Washed Eggs Dried during Passage Through Unit with Conveyor Traveling Zigzag Paths—G. W. Johnson, Overland Park, Kans. to Gordon Johnson Co., Kansas City, Mo. No. 2,441,884. May 18, 1948.

Edible Glyceride Oil Freed of Naturally-Occurring, Undesirable Solutes by Heating to at least 200 deg. C. in Absence of Oxygen Followed by Removal of Sludge and Deodorization by Steam Distillation under Vacuum—F. M. Sullivan, North Bergen, N. J. No. 2,441,923. May 18, 1948.

Dry Sodium Ascorbate made by Reacting Ascorbic Acid with Sodium Bicarbonate in Presence of Anhydrous Aliphatic Alcohol Containing not more than Five Carbon Atoms in Aliphatic Radical, Filtering, and Drying in Air-Free Atmosphere—Wm. A. Holland, Chicago. No. 2,442,005. May 25, 1948.

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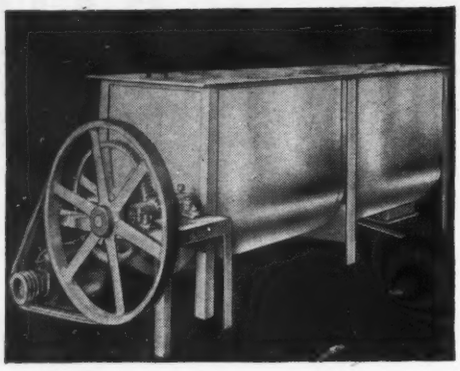

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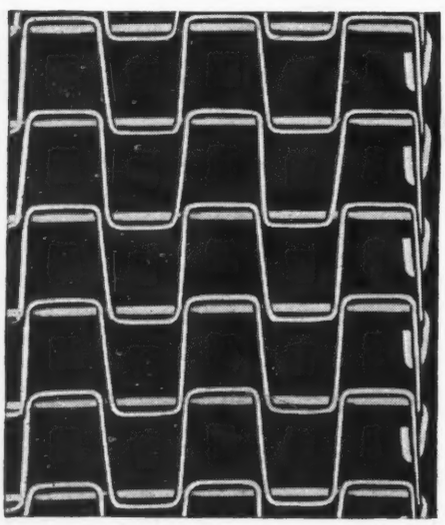

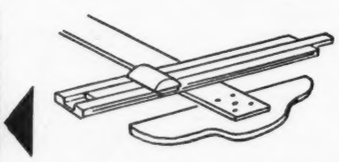

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Quaker Oats

(*Continued on page* 95)

because we feel they will tell our safety story better than the canned posters we buy from the National Safety Council. It develops that the lad started to draw while a prisoner of war in Germany.

The company has never lost sight of the importance of loyal and skilled service in building a permanent organization. Seniority is real and important here. Right inside the factory entrance is a typed roll call of every Akron employee, with the date of his or her entrance into the company.

Quaker Oats has always been known as a good place for women to work. Many mothers introduce their daughters: We have several mother-daughter teams, likewise fathers and sons.

Back in 1934 when many factories were trying to cut corners, Quaker Oats made a decisive move toward guaranteeing year-round employment. We couldn't tell customers what to order and how much and when, because our products are semi-perishable and many of them are seasonable. We sell ready-prepared cereals in hot weather, rolled oats in winter, pancake flour the year round, but more of it in chilly weather. We cannot control people's buying, but we decided that we could make a move toward greater security in jobs.

Guaranteed Minimum

Employees who have worked a minimum of 70 hours per month for six months become white-card workers. From then on, as long as they are on the payroll, they are promised 140 hours' pay a month. If they are laid off they get 70 hours pay, with a maximum of six months out of every 12 for employees who have been with us three years or more.

For accidents occurring outside of working hours we pay half-time. The length of payments depends on a man's or girl's service. It is a graduated scale to reward veterans. We have a pension plan that automatically retires males at 65, females at 60, and the company pays two-thirds of the cost.

Further, each year the company sets aside a certain share of the profits and pays it as a lump sum, about a month's extra pay, to employees every August. In these and other ways we try to make working for Quaker Oats a pleasant experience.

Proud as we may be of the past, however, we do not let tradition and old-time methods interfere with progress. The cornerstones for two early flour mills are cemented into the wall of the men's lunchroom; an early millstone serves as a table or bench. At Quaker Oats the old and established serves merely as a background for the new.

—End—

Potato Chips

(*Continued from page 99*)

it is possible to depress the oil uptake of tubers which have broken dormancy.

Liquid and Solid Fat

The relative oil uptakes when a solid and liquid fat are used under the same frying conditions for the same tuber lots is evident in Table VIII. The higher oil uptake found on using hydrogenated vegetable oil is probably due to the higher temperature of its solidification and resultant failure of the solid fat to drain sufficiently. The use of antioxidants in the frying oil was without influence on the oil content of the chips.

Fatty Acid Level

Effect of frying presalted chips on the free fatty acid levels in the frying oil was checked on 20 samples of presalted and 20 samples of cold water wash control chips. Results indicate that the free fatty acid levels are not increased by the presence of salt in the chips. In an industrial operation, however, care should be taken to avoid too high levels of magnesium and iron ions in the oil.

Effect of the initial frying temperatures on the oil uptake and frying interval is shown in Table IX.

Semi-Commercial Runs

The results of four semi-commercial runs, using various pretreatment combinations as given in Table X, show good depression of the oil uptake by pretreatment for 2 min. at 185 deg. F. with 7.5 percent sodium chloride.

If the hot sodium chloride bath is to be applied commercially, the tuber slices should be well agitated during treatment, temperature of the bath should be maintained and the treatment applied for a full 2 min. In actual practice it is observed that the tuber slices are slippery and do not cling well to the elevating drain belts. Reducing the angle of the belts or coating them with abrasives should remedy this. A more serious objection is that treated chips remain

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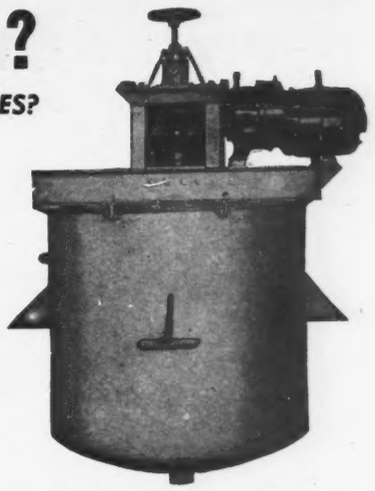

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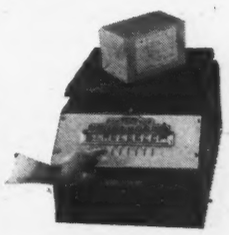

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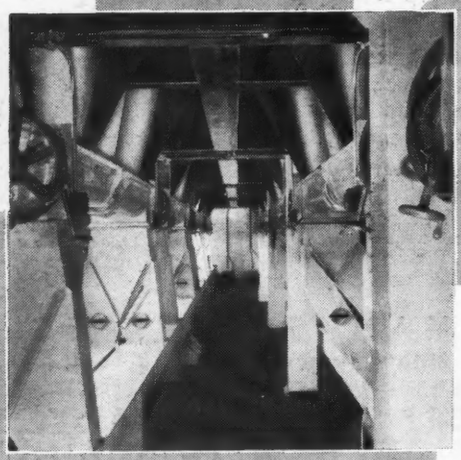

This view shows part of bin hoppers with supporting fins and percentage feeders at the King Midas flour and feed mill at Hastings, Minn.

NOW you can modernize your packing and storage departments with **DAY** black iron, galvanized or stainless steel bins for economical storage of all bulk materials.

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DAY bins are flexible because any number can be installed at any one time and the number increased as desired. They can easily be installed where other types *just won't fit.* Their capacity can be increased at any time by adding sections at top or bottom. They can be taken down later and moved to a new location with only erection costs to consider.

These flexible **DAY** steel bins have the additional advantage of smoothness so necessary for bulk storage. No finishing is required . . . no materials stick to the smooth, inside surfaces. Better control of temperatures and elimination of troublesome "sweating" or condensation inside are possible with heat-conducting steel walls.

DAY ENGINEERS can help you get economical bulk storage with insect and rodent free **DAY** steel bins. Call on **DAY** for dust control, pneumatic handling, DUAL-CLONE dust collectors, continuous-automatic dust filters, bag cleaners, exhaust fans spouting and leg casings.

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almost flat. This might be overcome by slicing the chips thinner.

Evidence that depression of oil uptake is a non-specific cation effect is shown in Table XI. Perhaps equimolar concentrations of the various salts would have given equal depressions. Though the mechanism of depression of oil uptake is unknown, it is conceivable that the salt prevents the increase in starch grain surface which may occur when hot water alone is used during the pretreating process.

Color Removal

The mechanism for removal of color forming components was also considered. Destruction of the selective permeability of the plasma membrane of the potato cells toward sugars and amino acids should allow the outward diffusion of reducing sugars and free amino acids and result in lighter colored chips on frying. Our tests indicated that the hot water treatment was not unique, for cytolysis with ether or freezing the raw chips also effected cellular disruption so that the sugars and amino acids could be removed with a cold water wash or prolonged hot water treatment.

Determinations

Analyses of the potatoes and chips were made in the following manner:

Water. The Dean and Stark[8] method was used on triplicate samples of fresh tissue. Plugs were stored at 40 deg. F. for not over 2 days. They were replugged with a 12 mm. cork borer immediately before analysis. Plugs were quartered for sampling purposes, and the tissue not used for water analysis was divided into a portion for drying and a portion for use as a source of sap.

Water content of the chips was determined by the Johnson[9] method, which involves drying in a vacuum oven at 140 to 149 deg. F. for 6 hr.

Ash. Portions of the replugged tissue were dried in a forced air stream at 149 deg. F. for 48 hr. The dry tissue was ground with mortar and pestle, and 1 to 3 gram samples in duplicate were ashed in an electric furnace at 950 deg. F. for 24 hr.

The ash content of chips was determined on ether extracted samples by heating directly in the alundum extraction thimbles at 950 deg. F. for 24 hr.

Total Nitrogen. Semi-micro Kjeldahl determinations were made on approximately 100 mg. samples of dry, ground tissue, by the Umbreit and Bond[10] method. Chips were first extracted with ether, ground and dried before sampling.

Total nitrogen was also determined on 1 ml. aliquots of sap.

Preparation of Sap. Fresh tuber tissue not used for water determination or for drying was ground in a meat grinder and the sap expressed through cheesecloth by hand. The suspension was centrifuged to remove cell fragments and starch, and the supernatant used for all analyses of the sap. The pH of the sap was determined with a glass electrode.

Non-Protein Nitrogen. The protein nitrogen was precipitated from the sap with an equal volume of 10 percent trichloroacetic acid, centrifuged, and the supernatant analyzed by the Kjeldahl method to give a value for "non-protein" nitrogen.

Ammonia and Amide Nitrogen. Ammonia from 0.1 ml. of sap was aerated[10] from a solution buffered at pH 9.6 (see Vickery et al.[11]) and determined with Nessler's reagent.[12] Protein was removed from the sap by precipitation with tungstic acid[13] and the supernatent used for amide determination. Glutamine and asparagine were selectively hydrolyzed,[11] the ammonia released and aerated into acid for determination with Nessler's reagent.

Sugars. A modification of the Shaffer, Somogyi,[14] copper iodimetric procedure was used for sugar determinations. Lead acetate was used to clarify the sap with the excess of lead being removed with a minimum amount of sodium oxalate. Reducing sugars were then determined, and total sugars following acid hydrolysis and neutralization.

Oil content of the chips was determined by both weight loss and oil recovery on ether extraction. The weight loss value was always slightly greater, doubtless because of the extraction of a small amount of water from the chips. Samples of 3 to 10 g. were packed into tared alundum thimbles and extracted with ethyl ether for 12 to 18 hr. Finally ether was removed from the tared extraction tubes and alundum thimbles in a vacuum desiccator, and the dry oil and extracted chips weighed.

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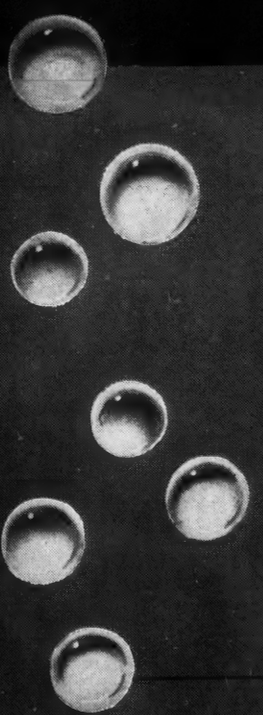

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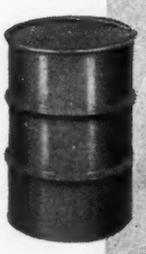

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—End—

IFT Conference

(*Continued from page* 103)

Use of the material in meat products is established, but for vegetables it is less well known. Taste threshold is 1 part in 3000. Tests were made with glutamate in cooked vegetables as well as in raw (salad) vegetables.

Glutamate altered the character of the cooked vegetables in every case in which it was tried. As a seasoning, it caused marked improvement in flavor appeal without itself being noticeable. Monosodium glutamate was compatible with fresh vegetables, as is shown by tests in which the vegetables were used in tossed salads.

In deciding on the amount of glutamate to add, the addition should always be stopped before the glutamate itself becomes noticeable. Blander vegetbles require less than the more strongly flavored ones. The amount of glutamate is usually a fraction of a percent.

Principal effect on vegetables is to balance, blend and reinforce the natural flavors. Characteristic of this effect is the suppression of sourness, rawness, earthiness and certain other undesirable notes.

The speaker described the taste testing procedure used in the work with vegetables. The way the tests are made will influence the formulations and the appraisals of the results obtained with them. The work was done in part by having the tasters report on samples independently, then by conference discussion.

For a first trial, a standard lot of the vegetable—for example, broccoli—was prepared. This was divided in small portions to which graded

amounts of glutamate were added. The tasters sampled the results, compared notes, then resampled. Later, regular batches were prepared for further test, using the proportions decided on in the preliminary experiments.

Sterilization Problems

The session on sterilization got underway with a discussion of a technic and apparatus for studying the resistance of bacterial spores to temperatures as high as 270 deg. F. The speaker, C. R. Stumbo, Food Machinery Corp., described the thermoresistometer. It accomplishes almost instantaneous heating of the medium in which the spores are suspended, to as high as 270 deg. F., by means of live steam. Equally fast cooling, to below 212 deg. F., is effected by evaporation of moisture from the sample. This fast heating and cooling makes it possible to obtain more accurate thermal-resistance data than are obtainable by previously used methods. It also reduces the time required for the determinations.

George H. Brown, R. C. A. Laboratories, explained a series of experiments carried out on the effects of strong radio-frequency fields on microorganisms in milk. Even though a wide range of frequencies were used and experiments reported by others were repeated in the R.C.A. laboratory, Dr. Brown was not optimistic. His present conclusions are that the bacterial reductions obtained were due to the heat generated in the milk rather than to the effect of high frequency radiation.

Mathematical methods for evaluating the effect of heat processing of canned foods upon their organoleptic quality were described by C. Olin Ball, consulting food technologist. These evaluations are made through modifications of the procedures commonly used in calculating the value of sterilizing processes. One method employs a thermal death time or similar curve; another a survivor curve. Both methods give results applying to any given instant in a process.

Frozen Foods

In the session on frozen foods, M. A. Joslyn, University of California, stressed the necessity for substituting objective methods for the subjective methods now used for evaluating liquid sugars in the freezing of fruit products. Such objective methods, he said, include data on sugar absorption or penetration, color retention and ascorbic acid retention. Discoloration does not take place, he revealed, unless the natural ascorbic acid in the fruit is reduced. Sugar exerts a marked inhibiting effect on enzymatic oxidation

MAKE THIS SIMPLE TEST: Place a small amount of the product you are now mixing on a ground glass and run a spatula through the center of the mass. If the batch is not thoroughly mixed and blended—you will find tell-tale lumps which you would never see by ordinary examination.

The photo shows the actual result of a test on a product in which thorough mixing was very important. Notice the absence of blotches on the Simpson-mulled batch. This is just one example of how the Simpson method of mixing by "mulling" produces a more uniform mix than by any other method.

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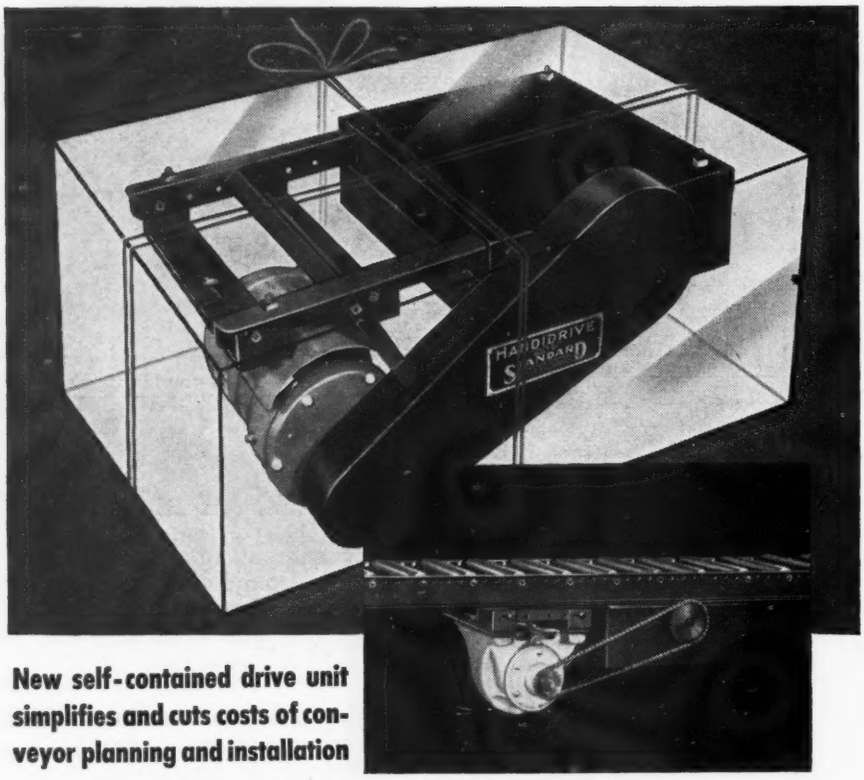

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of ascorbic acid by reducing the rate of diffusion of oxygen in the sirup. The amount of copper and iron in the sirup also influences the extent to which ascorbic acid is oxidized.

W. B. Esselen, Jr., University of Massachusetts, reported that apple pies made from frozen sliced apples that were treated with salt acid dips, or SO_2 had better flavor and aroma than pies from freshly sliced apples.

A new crystallographic method for studying changes in processed foods was described in a paper prepared by Hans Friess, Forschungsanstalt fuer Lebensmittel Frichhaltung, Technische Hochschule, Karlsruhe, Germany, and read by Rudolph P. Plank. The nature of food substances can be determined microscopically from characteristic crystallization patterns found by adding them to cupric chloride solutions. These crystalline patterns, or microforms, are weakened and simplified by freezing. They are destroyed, on the other hand, by heating these food substances up to 70 deg. C.

Exhibits Reviewed

Some 47 manufacturers of equipment, materials and apparatus were represented in the exhibit booths, which were arranged conveniently near the meeting rooms.

Current interest in two kinds of processing aids was evident from the many booths in which they were shown, and from the attention these booths attracted. Antioxidant and antistaling materials were shown by at least five suppliers, with an equal number featuring aids to plant sanitation.

A new type of container with many interesting possibilities was exhibited for the first time by Crown Can Co. A 12-oz. can equipped with a simple pressure release valve, it is being introduced for the distribution of whipping cream under pressure.

Control instrument companies exhibited units of especial interest to operating personnel. A new multipoint temperature recorder has been developed by Foxboro Co. It will record the temperature of several beer tanks, for example, on one chart.

Laboratory personnel were attracted by three booths showing improved microscopes. Late models of RCA's electron microscope were in operation. Two optical instrument companies, American Optical Co. and Bausch & Lomb Optical Co., exhibited their versions of the phase microscope, a new form of the light microscope.

An exhibit of general interest was the display arranged by the Quartermaster Food & Container Institute, Chicago. Containers of special rations were on view, along with samples of items in the experimental stage.

covered in Step No. 12, the actual ordering.

The purchase order should make reference to the supplier's proposal that is now being accepted, and also to the specifications and performance guarantee to be met. It is also customary, in many cases, to include in the order some such statement as the following:

"Check all sizes, clearances, weights and detailed specifications with plant engineer (or plant manager, or other designated responsible individual) before fabrication."

This is a safeguard against having a machine assembled and shipped which is too large to go into the building, too heavy for the elevators, or otherwise unsuitable. Under these conditions, special arrangements must be made for handling, probably at increased cost.

Whenever a performance guarantee is a part of a purchase order, there should be an agreement on a trial period, extending after installation of the equipment. Compliance with the guarantee will then be determined, with a definite acceptance or rejection of the machine made within that period.

Purchase orders for equipment must, of course, be specific on shipping instructions. Whenever installation is the responsibility of the seller, the technicalities of compensation, liability, and union regulations will have to be covered by properly worded clauses in the order. Here, legal advice is desirable.

Another question that should be covered in equipment purchase orders is that of liability for any possible patent litigation. Here, too, legal counsel is indicated.

Finally, the order should be specific regarding compliance of equipment with safety regulations, such as Labor Department rulings on safety guards, Underwriters' approval, and the like. Many companies, of course, have standard clauses to cover such questions.

After Installation

Step No. 13 involves actual check of the new equipment after installation. Of course, prompt trial runs to determine compliance with performance guarantee are essential. Final payment of invoice should not be authorized until guaranteed performance has been verified.

The type and extent of acceptance tests will vary widely according to individual circumstances. An individual or department should be responsible for making the tests, and the results should be furnished to, and approved

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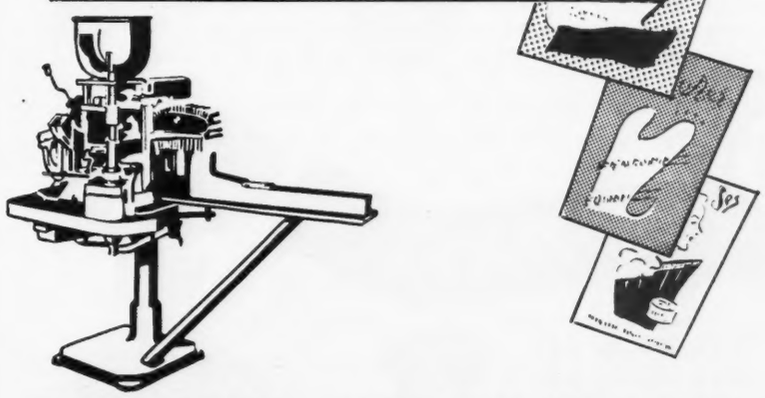
Dry, free-flowing, food products packaged in Brown Bag open-end envelopes already have a long history of success. Consumers judge a product by its wrapping. Brown packets carry every ounce of sales punch you have built up in your regular sized package.

You would look a long time to find more experienced hands than those at Brown to fashion your packets for you. Brown Bag open-end envelopes are stoutly made, with well-gummed edges, to prevent shrinkage and leakage of your product. Once sealed, they stay sealed. And they are made exactly to your specifications, with your trademark, design, and directions for use all carefully reproduced.

Send for a complete range of samples of Brown Bag packets now used for individual sales and as enclosures with other products — plus the story of how they have made sales history for leading food processors.



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FITCHBURG, MASS.

West Coast Representatives
Peter D. Bowley & Assoc., 210 Mississippi St., San Francisco, Calif.

Simplify valve selection with this LUNKENHEIMER "RENEWO" THREESOME...

The "RENEWO" Threesome is fully described in Circular No. 577, which also explains the economy feature of converting one type to another by simply changing seat and disc. A copy is yours for the asking . . . from your Lunkenheimer Distributor or from us direct.

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1 REGULAR TYPE...

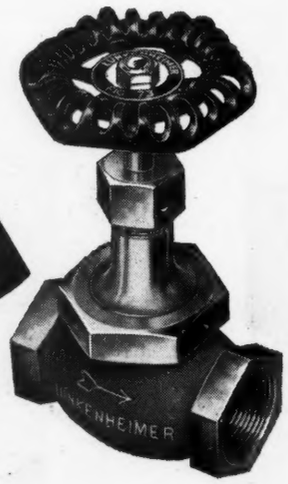

Fig. 73 200 lb. S.P.

Fig. 16 300 lb. S.P.

Regular "RENEWO": one of the most popular and widely used valves ever designed for general service. As the name clearly implies, all parts are renewable.

2 "P" TYPE...

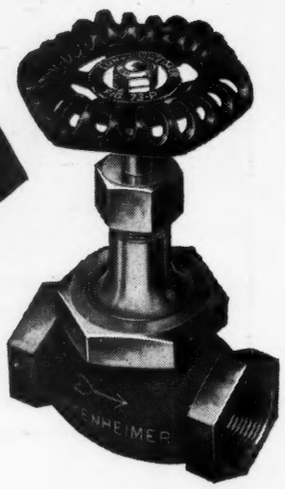

Fig. 73-P 200 lb. S.P.

Fig. 16-P 300 lb. S.P.

"P" (Plug Type) "RENEWO": for throttling, drain, drip, water column blowdown and similar service. The "NS5" Nickel Alloy 330 Brinell seating material, developed and patented by Lunkenheimer, has exceptional wearing qualities and high corrosion resistance.

3 "PS" TYPE...

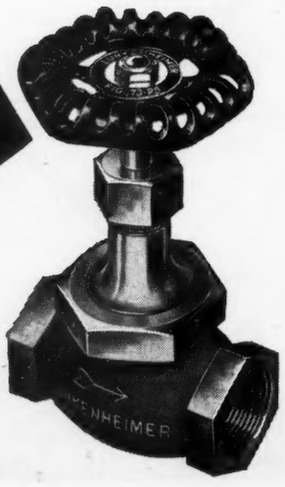

Fig. 73-PS 200 lb. S.P.

Fig. 16-PS 300 lb. S.P.

"PS" (Plug Type) "RENEWO": for maximum resistance to the effects of close throttling and other severe service, particularly where abrasive conditions are encountered. Equipped with stainless steel 500 Brinell seat and disc.

by, all interested parties before machine acceptance is considered final.

Even if no performance guarantee is involved, a routine check-up is desirable for several reasons. For one reason, inspection, adjustment and lubrication schedules for the initial operating period may be required, and it is important to make sure that they are being followed, if best performance is to be obtained.

Most equipment bears a gaurantee against defective materials and workmanship for a specified period. Nothing should be overlooked during this period if the full benefit of such a guarantee is to be gained.

Lastly, the estimates, judgments, and occasional assumptions that may have entered into some of the steps will need to be checked against actual performance so as to locate any errors that may have entered into the overall analysis. Mistakes will occur occasionally and, when they do, it is better to detect them promptly and thereby profit by the experience, rather than have them revealed later through poor quality product, dissatisfied labor, or abnormal costs.

One qualifying word: While this 13-step procedure has proved both effective and necessary in a large organization with scattered production points and centralized headquarters, we grant that it cannot be expected to fit every type of enterprise equally well. Nevertheless, the basic points comprising these steps remain fundamental and, accordingly, judicious modification will make the procedure applicable to most cases of equipment selection.

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2. G. W. Meek & V. H. Greene, "Food Freezers Evaluted", *Food Industries*, Vol. 19, No. 9, pg. 92.

—End—

Ion Exchange Resins

(*Continued from page* 93)

Amberlite IR-105. This mixture will deionize solutions and at the same time maintain a neutral pH. For regeneration, the two resins (which differ considerably in density) are separated from one another by a hydraulic operation.

Solutions that would be adversely affected by exposure to low pH can be safely treated by reverse deionization, using IRA-400 in the anion exchanger. Standard engineering principles and existing equipment can be retained. Solutions to be deionized are first subjected to the anion exchanger. The alkaline effluent from

"Make mine walnut, Mom!"

It's so easy to have your favorite sundae right at home! All you need is a few jars of Evans luscious pineapple, creamy butterscotch, walnut, or everybody's favorite, chocolate fudge. It's as simple as that—and think of the variety of desserts!
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E. B. Evans Company of Philadelphia seals these fine products with Crown Screw Caps—and for such good reasons as Crown's dependable sanitary coatings, Crown's hermetic sealing Slip Rubber Rings and, of course, the famous Deep Hook Thread, which seals tighter with any given application force without wedging or scraping the jar threads.

If a metal closure is part of your package, it will be well worth your while to get the facts about Crown Closures. Crown Cork & Seal Company, Baltimore 3, Maryland.
World's Largest Makers of Metal Closures.

Approved by Millions of Housewives

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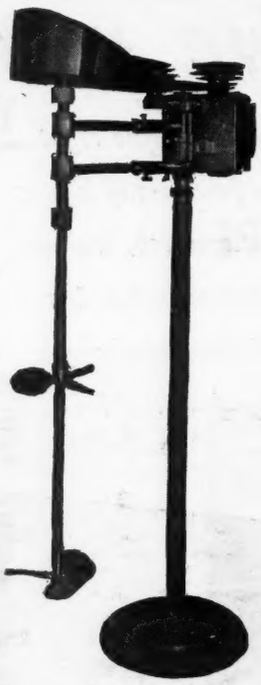

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The New TERRISS 3-Speed Portable Mixer is an all-around unit that will take care of all your mixing, blending and agitating problems. If your tank or vat is below floor level the TERRISS 3-Speed Mixer will reach down and do a real job for you. If your container sits on the floor, a little adjustment and the mixing begins. If your tank or container is high off the floor, the TERRISS Mixer will lift up and do the mixing job.

All parts that touch your product are Stainless Steel. Standard belt drive permits propeller speeds of 175 RPM, 325 RPM and 575 RPM. Other combinations are available with simple adjustments. Both propeller shaft and stand are adjustable, permitting unlimited settings to fit any job in your plant.

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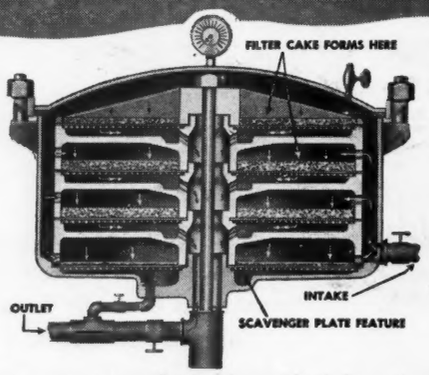
SPARKLER *horizontal plate* FILTERS

Capacities 50 G.P.H. to 5000 G.P.H.



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Chicken Broth
Cider
Egg Albumen
Extracts
Flavors
Honey
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Liquors
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Molasses
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Syrups
Vinegars
Wines
Fruit Juices
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Alkalies
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Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

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this column is then subjected to cation exchange.

Amberlite IRC-50 derives its exchange activity from carboxylic acid groups. Because of its avidity for the hydrogen ion, any adsorbed cation can be desorbed easily by treatment with dilute acid, the regeneration efficiency approaching 100 percent. The development of this resin eliminates the difficulties in the ion exchange process for separating basic amino acids.

Preliminary treatment of the exchanger with an appropriate buffer converts the resin to a combined salt-acid form. Cation exchange then occurs at a controlled pH. The ratio of sodium to hydrogen is adjusted to give a pH below the isoelectric point of arginine, histidine and lysine, but above the isoelectric points of the neutral and acidic amino acids. Then only the basic ones will exist as cations in solution. They will be adsorbed by the resin while the other amino acids pass through the bed unaffected.

Amberlite IR-105 is a high-capacity, sulphonic-acid-type cation exchanger especially designed for the water conditioning field. Other indicated applications are in by-product recovery and waste treatment.

Exceptionally high exchange capacity, unusual stability at elevated temperatures and excellent chemical resistance over the entire pH range are a few of the outstanding properties of the fourth new resin—Amberlite IR-120. Suggested uses for this resin are in water conditioning, sugar processing, waste treatment and pharmaceutical manufacture.

—End—

Protein Hydrolysate

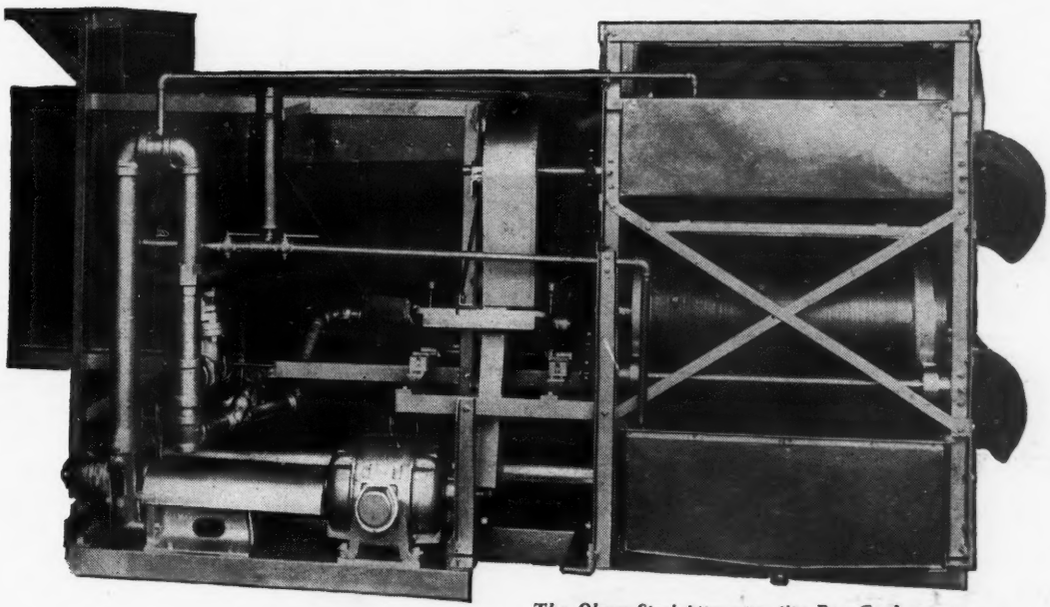
(*Continued from page* 110)

Frequently, the tests have indicated the use of protein hydrolysate, depending, however, on the type of food product and its taste and appearance. Some of the products which have been investigated are bouillon, soya sauces, dehydrated soup mixes, gravy powder, sausage meat, processed meat, stews, corned beef hash and bakery products. Other foods are named in Table IV.

It is recognized, however, that in chicken soups, both liquid and dehydrated, and perhaps in other light colored soups, monosodium glutamate is the flavoring of choice, not only because of taste factors, but also because the Maillard reaction proceeds much more slowly, if at all. In chicken soup mixes, both liquid and dry, however, excellent results and stable color reactions have been observed when a 50-50 mixture of glutamate and a protein

LIGHT PEA **...HEAVY PEA**

TENDER PEA **...TOUGH PEA**



The Olney Straightline Quality Pea Grader, overcomes contamination by salt brine corrosion by using pure Nickel for all parts contacting peas during separation by flotation process.

Salt Brine separates them . . . NICKEL guards their purity . . . in this OLNEY STRAIGHTLINE QUALITY PEA GRADER

Nickel, pure Nickel, stands on guard in this Olney equipment. What other metal could so successfully operate full tilt during the rush of the canning season? Or stand, during long months of idleness, without giving in to corrosion and rust?

Everyone knows how salt brine attacks most metals. How pitting and corrosion weaken metal parts and make them hard to clean. But *not* everyone realizes how Nickel *resists* the action of salt.

That's a fact every food canner ought to understand—especially if he watches his costs of repairs, parts replacements, and clean-up time. He ought to understand, too, how Nickel guards the appearance and flavor of his pack. *That's When Product Purity Counts.*

For details about this Olney Pea Grader, write to George J. Olney, Westernville, N. Y.

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USE PURE **Nickel** *WHERE PURITY COUNTS*

TARGET FOR TODAY AND EVERY DAY

You can safeguard sanitation in your plant with germ-destroying *Wyandotte Steri-Chlor**.

This effective germicide and deodorant is safe and economical to use. Readily and completely soluble, it gives a clear solution in either hard or soft water. It holds its strength in solution at low as well as high temperatures and there is a simple method for determining the proper strength.

The value of Steri-Chlor as a deodorant is demonstrated by the "onion smear test" on a person's hands. A quick washing with Steri-Chlor and the odor is gone; hands smell sweet and clean again.

Steri-Chlor makes an excellent rinse or spray for sanitary pipe lines, vats, mixing equipment and utensils. Metal immersion tests have proved it is safe to use on this and other equipment. It is invaluable, too, as a germicidal rinse for workers' hands.

We'll be glad to furnish you with a sample of Wyandotte Steri-Chlor at your request. Why not write today?

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hydrolysate powder was used, particularly when sucrose replaces dextrose in the formulation—using only 60 percent as much sucrose as dextrose.

The protein hydrolysate used in these experiments, containing approximately 16 percent monosodium glutamate, was processed from a combination of wheat gluten and extracted soya flour. With hydrolysate products of low monosodium glutamate content —such as those produced from materials from which the glutamic acid had been commercially extracted—the results were exceedingly unsatisfactory as to taste, color and flavor acceptability.

In this discussion it is important to touch briefly on the economics of protein hydrolysates compared with monosodium glutamate. Tests have shown that monosodium glutamate and a good protein hydrolysate give values to a flavor in the ratio of approximately 1.25 to 2. On the basis of this ratio, at 60c. a pound for protein hydrolysate and $1.50 for monosodium glutamate, the costs are, respectively, $1.20 and $1.87½—a saving of 67½c. per pound when protein hydrolysate is the flavor.

If these ingredients are used in a sucrose containing dehydrated chicken soup formula on a 50-50 basis, in the amount of 5 percent, the cost would be $5.25 per 100 lb. of soup mix, as against $7.50 per 100 lb. if monosodium glutamate alone were used. This is a very substantial saving in the manufacture of any product.

Further, on the basis of 60 percent flavoring amino acid salts in protein hydrolysates, the cost of flavor is $1.00 per pound of flavor compared with $1.50 per pound of flavor when monosodium glutamate is used. Some hydrolysates, produced as a by-product from monosodium glutamate manufacture, contain, in the dry form, from 3 to 5 percent monosodium glutamate. These products sell at 20 to 30c. per pound.

If they contain the apparent optimum of 5 percent monosodium glutamate and sell at the lower figure of 20c. per pound for the monosodium glutamate content alone, their cost is 64¢ per pound cost for the unextracted hydrolysate containing an average of 16 percent monosodium glutamate. Usually, the unextracted hydrolysate has a better color, more delicious taste and is less hygroscopic than the extracted hydrolysate.

Proper discrimination in selecting protein hydrolysates and careful compounding of hydrolysates and monosodium glutamate not only give superior taste and flavor to the finished product but also contribute to a more

a healthier generation

A new generation of Americans is growing to maturity—healthy, husky, and alert! They are the children of the new enrichment age, wherein full, balanced nutrition is an important consideration.

Bread, always the staff of life, is the keystone of this new emphasis on improved nutrition. The American housewife has learned to read labels and wrappers carefully for assurance that her family's food will provide the vitamins, minerals, and calories necessary to buoyant health. Now, as never before, bread—*enriched bread*—is the preferred family food.

As the foremost manufacturer of pure vitamins and minerals, Merck has served as a central and dependable source of enrichment ingredients. Backed by thorough experience, extensive resources, and rapidly expanding production facilities, we will continue to serve the baking field and other branches of the food industry eager to incorporate decisive nutritional advantages into their products.

MERCK ENRICHMENT PRODUCTS

Merck provides an outstanding service for the milling, baking, cereal, and macaroni industries.

Merck Enrichment Ingredients

Merck Vitamin Mixtures for Flour Enrichment

Merck Bread-Enrichment Wafers

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(191)

profitable cost structure. For his own satisfaction, the processor should conduct flavor tests with a good protein hydrolysate, monosodium glutamate, and combinations of them in various food products. The outcome may be a surprise. It is frequently possible to produce products with superior taste and flavor characteristics, and to extend and expand the use of protein hydrolysates, to advantage.

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—End—

Bakeries Benefit

(*Continued from page 79*)

Overall for the period, the shop operated at $686 under standard. This tells us how well it is doing. And examination of category figures indicates just where it shows strength, and where it shows weakness.

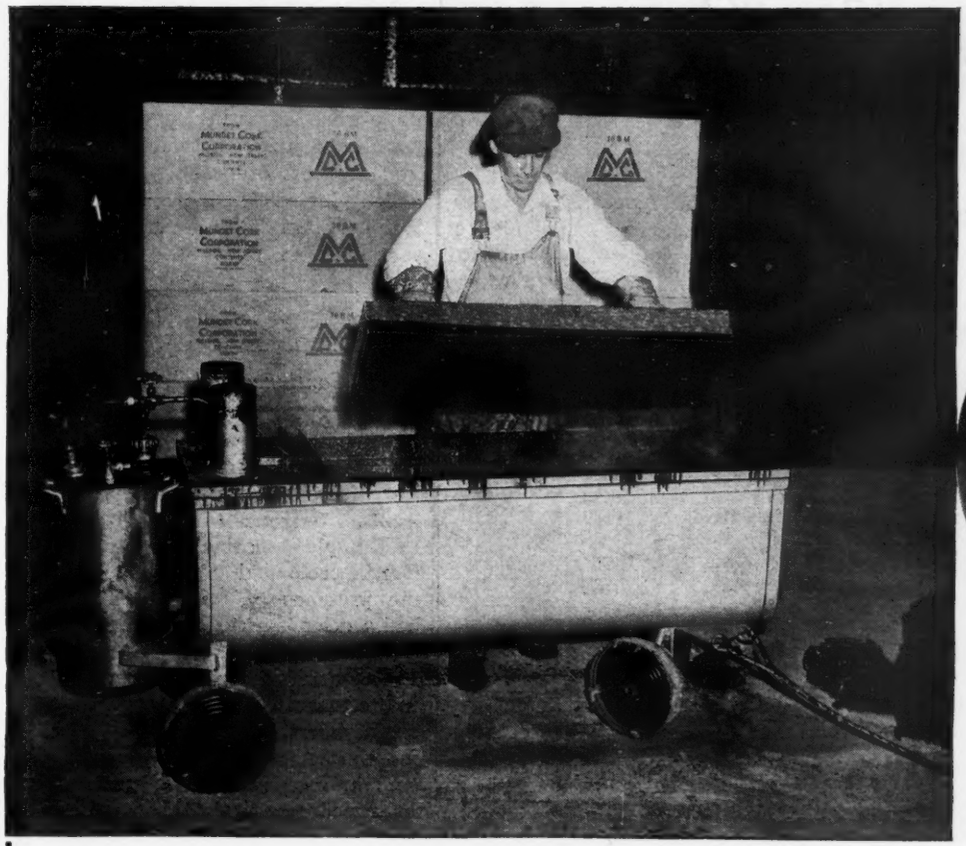
Labor Costs

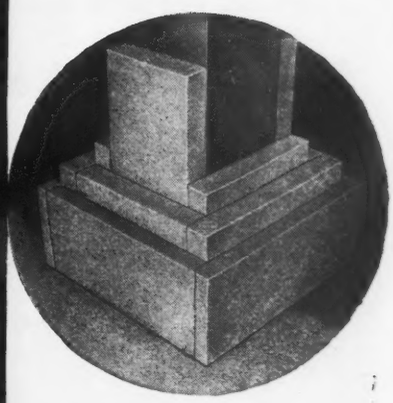
In this specific report something is shown to be amiss in labor costs. Immediately, a copy of the payroll is checked against the payroll standard personnel setup. We may find that, for the period, the shop carried one porter and two packers in excess. Or perhaps the excess dollar payroll was caused by overtime, when the output attained in the period should have been produced without overtime.

Perhaps a major breakdown occurred, or a holiday was included in the period for which the contract called for straight time pay for the day—causing overtime for the end of the week. There is always a definite explanation. And with this method it is possible to put the pencil on this explanation.

In the past, however, management merely noted that the payroll percentage was up. In fact, under the old method it could be quite possible that the $225 excess payroll occurred without charging payroll percentage. Or the payroll percentage could have decreased due to other factors, such as increased sales, or higher proportion

For Operation Zero – *Specify* CORK





Circle view shows detail of column insulation. Overlapping layers of Corkboard serve to guard against heat infiltration.

At left, dip coat of hot asphalt provides moisture-proof seal for Corkboard.

THE Mundet Corkboard being erected in this zero-holding room will be a principal factor in profitable operation.

Temperature vagaries boost refrigeration costs; a temperature lapse of only a few degrees is liable to affect the market-quality of frozen foods. These are important reasons for securing the best protection. For frozen food packers and distributors, who are profit- and quality-minded, *cork is the choice!*

If you are considering low temperature construction, Mundet Contract Services can relieve you of many problems. Competent and experienced personnel will take over and carry through from preliminary planning to the completed installation. For estimates and recommendations address Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Avenue, North Bergen, N. J.

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More Sales Appeal

with a

SEALTITE

Package

- **A SEALTITE** bag package is ideal for coffee, sugar, salt, flour, starch, cereal or any product usually packed in a paper bag.
- Any **STANDARD** gusseted bag can be used... no special premium priced bag is necessary.
- **SEALTITE** settles, shapes and seals 2 to 10 lb. bags at speeds ranging from 30 to 50 bags per minute.
- **SEALTITE** delivers a square, flat-topped package that is sift-proof and can be stacked like a carton.
- Users report savings as high as $500.00 per month per machine with **SEALTITE.**

Write for prices and delivery

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

of the more profitable items. This overpayment of payroll would then have been hidden.

One of the biggest causes of excessive costs in the baking industry is the volatile behavior of the materials. Often, handling of materials varies, leading to temporary excess costs until the condition is remedied.

All told, it can be seen that by setting up precise operating standards, it is possible to judge each factor that goes into the cost of production—judge it exactly for what it is, without the confusion of its relation to such a variable as sales.

—End—

Mackerel Fillet

(*Continued from page* 82)

was shown to have prevented any major changes up to five months. Propyl gallate, thiodipropionic acid, lecithin, NDGA (0.01 percent) and lecithin plus ascorbic acid were ineffective in prolonged storage life. In fact, the presence of thiodipropionic acid had a deleterious effect on flavor after the first month.

Gallic acid, ascorbic acid and NDGA in cottonseed oil appeared to delay spoilage until the seventh or eighth month. A secondary dip of ascorbic acid in Irish moss extractive solution improved the performance of the NDGA-in-oil dip to some extent. No. improvement, however, could be noted with a plain hydrocolloid solution as a secondary dip.

When gum guaiac was used, there was no noticeable change until the twelfth month. But the smoky odor and flavor, which are more out of place than objectionable, could easily have masked any changes until they become very marked. A tabulated summary of the effects of the various antioxidants is shown in Table II.

It should be noted that these tests were on an early season fish with low oil content. As noted, the fish were obtained an unusually short time after being caught, and they were processed more rapidly than could be expected under normal commercial conditions. Accordingly, the results of this work are indicative of what could be obtained under optimum conditions.

Further and more extensive testing of these three materials is indicated, employing mackerel of higher oil content and working under more conventional conditions.

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